Initial	Date
PO	12/21/00
CW	12-22-00
MEJ	12/22/00
JB	12/21/00

BA WAR

Mail Stop 60189

DEC 2 2 2000

Memorandum

To: Regional Engineer, Region 6

From: Chief, Water Resources (60189) Cheryl A. Willis

Subject: Design Flood for Case No. 1 Dam, Arapaho NWR, Colorado

Pursuant to your request for 50- and 100-year flood hydrographs and routing of these events through Case Reservoir No. 1, we reviewed the 1987 Intermediate SEED Inspection Report (HEC run attached) and diversion records for Hubbard No. 2 and 4 Ditches (attached), spoke with Refuge staff, and performed several HEC 1 analyses (attached). The HEC 1 output files have been e-mailed to Don Fazzan.

As you review the 1987 and current HEC 1 analyses, please bear in mind Case No. 1 Reservoir receives almost all of its water from the Illinois River via the Hubbard Ditch system and not from runoff draining off the small amount of up-gradient area. In addition, much of the up-gradient area drains into the Hubbard Ditch, and not into the reservoir. Also, the little amount of baseflow (less than 5 cfs) supplied by two springs upgradient of the reservoir is captured by the Hubbard Ditch and does not flow into Case No. 1 Reservoir. Nonetheless, we modeled the entire drainage area and estimated a baseflow of 0.16 cfs.

The 1987 HEC 1 analysis produced a peak subbasin inflow of 84 cfs, a peak reservoir outflow of 8 cfs, peak storage of 74 acre-feet, and a peak stage of 8130.39 feet. The following input variables were used:

- 100-year, 24-hour storm with the following duration depths:

5-minute:	0.42 inches
15-minute:	0.82 inches
60-minute:	1.44 inches
2-hour:	1.53 inches
3-hour:	1.61 inches
6-hour:	1.80 inches
12-hour:	2.15 inches

24-hour: 2.40 inches

- Drainage area of 0.32 square miles (204 acres).

- Reservoir storage before storm: 0 acre-feet.

- Baseflow before storm: 0.16 cfs.

- SCS unit hydrograph with a time lag factor of 0.29. (The time lag is the amount of time, in hours, between the centroid of rainfall excess to the peak of the unit hydrograph.)

- SCS loss rate computed from an initial abstraction (the surface moisture storage capacity at the beginning of the storm, in inches) of 0.78, curve number of 72, and no impervious area.

- Dam and reservoir characteristics as follows:

Elevation 8119.00:	0.0 square feet surface area
Elevation 8131.00:	21.6 square feet surface area
Elevation 8132.00:	28.3 square feet surface area
Top of dam:	8132.10 feet
Width of dam:	510.00 feet
Weir coeff:	2.8
Head exponent:	1.5
Left spillway crest elev:	8129.90 feet
Left spillway length:	200 feet
Right spillway crest elev:	8130.4 feet
Right spillway length:	75 feet
Spillway crest elev:	8129.90 feet
Spillway width:	**0.0 feet**
Weir coeff:	3.0
Head exponent:	1.5

(Note: The spillway card really did not even have to be included, as the zero width made the spillway discharge zero. The modelers attempted to model spillway discharge using the non-level top of dam method.)

The non-level top of dam method described below was used to model the above characteristics:

Elevation 8129.90	0.0 feet dam width
Elevation 8130.40:	20.00 feet dam width
Elevation 8131.50:	230.00 dam width

Elevation 8132.10: 275.00 dam width
Elevation 8132.10: 785.00 dam width
Coefficient of 2.8

(Note: The above point-pairs do not adequately represent the dam and spillway combination and, instead, describe the image pictured on the attached graph titled, "1987 HEC 1 Analysis.")

- Low-level outlet works: Not included.

For our analysis, we felt it appropriate to use the following input variables:

- Storm durations and depths.

For small dams and small watersheds, the SCS recommends a 6-hour duration or the time of concentration, whichever is greater. We estimated the time of concentration to be around 1 hour and thus used the 6-hour storm duration. The following were our depth-duration inputs.

100-year, 6-hour storm with the following duration depths:

5-minute:	0.42 inches
15-minute:	0.82 inches
60-minute:	1.44 inches
2-hour:	1.53 inches
3-hour:	1.61 inches
6-hour:	1.80 inches

50-year, 6-hour storm with the following duration depths:

5-minute:	0.36 inches
15-minute:	0.71 inches
60-minute:	1.25 inches
2-hour:	1.35 inches
3-hour:	1.45 inches
6-hour:	1.60 inches

- Drainage area of 0.32 square miles (204 acres).

- Reservoir storage before storm: 65 acre-feet, storage at emergency spillway crest, and acre-feet.

- Baseflow before storm: 0.16 cfs.

- SCS unit hydrograph with a time lag of 0.60 hour.

• SCS loss rate computed from an initial abstraction of 0.78, curve number of 72, and no impervious area.

• Dam and reservoir characteristics as follows:

top of dam:	8132.10 feet
width of dam:	510.00 feet
weir coeff:	2.8
head exponent:	1.5
left spillway crest elev:	8129.90 feet
left spillway length:	200 feet
right spillway crest elev:	8130.4 feet
right spillway length:	75 feet
weir coefficient:	3.0

Elevation 8119.00:	0.0 square feet surface area
Elevation 8129.90:	21.6 square feet surface area
Elevation 8132.10:	28.3 square feet surface area

(The redlined values are different from what was used in the 1987 HEC 1 run. These values were taken from the front table of the 1987 SEED Report and not the 1987 HEC 1 input record.)

A non-level top of dam method was used to model the dam and right spillway which total 585 feet in length. A separate spillway record was entered to describe the left spillway. The weir coefficients were taken from the 1987 report, as it provided the best available information for these variables.

Non-level top of dam input variables:

Elevation 8132.1	0 feet dam width
Elevation 8132.1:	20 feet dam width
Elevation 8130.4:	20 dam width
Elevation 8130.4:	95 dam width
Elevation 8132.1:	95 dam width
Elevation 8132.1:	585 dam width
Coefficient of 2.8	

Left spillway variables: 200 feet, coefficient of 3.0, head exponent of 1.5.

The attached graph titled "Year 2000 HEC 1 Analysis" pictures the non-level configuration.

• Outlet works: Not included.

The 2000 HEC 1 analysis for the 100-year, 6-hour storm produced a peak subbasin inflow of 34

cfs, a peak reservoir outflow of 13 cfs, peak storage of 80 acre-feet, and a peak stage of 8129.98 feet. For the 50-year, 6-hour storm, the peak subbasin inflow was 21 cfs, the peak reservoir outflow was 8 cfs, the peak storage was 80 acre-feet, and the peak stage was 8129.96 feet.

Please call my staff hydrologists, Meg Estep or Patti Fiedler, 303-236-5322 x232 or x273, respectively, if you have any questions concerning this memorandum or wish to have additional HEC 1 runs performed.

Attachments

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bcc: WR rf
RO rf
Arapaho NWR
WTR:PFiedler:jb:12/20/00
I:\PATTI\COLORADO\ARAPAHO\CASEHEC.MEM

U.S. FISH AND WILDLIFE SERVICE

ARAPAHO
NATIONAL WILDLIFE REFUGE
JACKSON COUNTY, COLORADO

CASE #1 DAM
FEDERAL INVENTORY NO. NONE
INTERMEDIATE SEED INSPECTION REPORT
JUNE 24, 1987

PREPARED AND SUBMITTED BY

Terry L. Clayton 10 Sept 87
DATE

TERRY L. CLAYTON
HYDROLOGIST

Robert T. Hart 9-10-87
DATE

ROBERT T. HART, P.E.
CIVIL ENGINEER

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID        ARAPAHO NWR
  2           ID        CASE NO. 1 DAM
  3           ID        100-YEAR PRECIPITATION  FROM NOAA ATLAS 2 VOL III - 1973
  4           IT       5                     250
  5           IO       3

  6           KK  INFLOW
  7           BA    0.32
  8           BF     -.5     -.25      1.2
  9           PH       1               .42      .82     1.44     1.53     1.61     1.80     2.15     2.40
 10           LS               72        5      1.5        1        2        3        6       12       24
 11           UD    0.29

 12           KK     DAM
 13           KO       1
 14           RS       1     STOR       -1
 15           SA       0     21.6     28.3
 16           SE  8119.0   8131.0   8132.1
 17           SS  8129.9        0      3.0      1.5
 18           ST  8132.1      510      2.8      1.5
 19           SW       0       20      230      275      785
 20           SE  8129.9   8130.4   8131.5   8132.1   8132.1
 21           ZZ
```

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*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            FEBRUARY 1981              *
*          REVISED 14 JUN 85            *
*                                       *
*      RUN DATE: Tue 08-SEP-1987        *
*          TIME: 13:15:40.85            *
*                                       *
*****************************************
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************************************
*                                  *
*    U.S. ARMY CORPS OF ENGINEERS  *
*  THE HYDROLOGIC ENGINEERING CENTER
*          609 SECOND STREET       *
*        DAVIS, CALIFORNIA 95616   *
*                                  *
*  (916) 756-1104 OR (FTS) 448-3285
*                                  *
************************************
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                              ARAPAHO NWR
                              CASE NO. 1 DAM
                              100-YEAR PRECIPITATION  FROM NOAA ATLAS 2 VOL III - 1973
  5 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          3  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN          5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1   0  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ        250  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1   0  ENDING DATE
                     NDTIME       2045  ENDING TIME

                 COMPUTATION INTERVAL    0.08 HOURS
                      TOTAL TIME BASE   20.75 HOURS

        ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *

          **************
          *            *
  6 KK    *   INFLOW   *
          *            *
          **************

             SUBBASIN RUNOFF DATA

  7 BA        SUBBASIN CHARACTERISTICS
                   TAREA        0.32  SUBBASIN AREA

  8 BF        BASE FLOW CHARACTERISTICS
                   STRTQ        0.16  INITIAL FLOW
                   QRCSN       -0.25  BEGIN BASE FLOW RECESSION
                   RTIOR     1.20000  RECESSION CONSTANT

              PRECIPITATION DATA

  9 PH                                DEPTHS FOR   1-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
               0.42    0.82    1.44    1.53    1.61    1.80    2.15    2.40    0.00    0.00    0.00    0.00

                                                 STORM AREA =    0.32

 10 LS        SCS LOSS RATE
                   STRTL        0.78  INITIAL ABSTRACTION
                  CRVNBR       72.00  CURVE NUMBER
                   RTIMP        0.00  PERCENT IMPERVIOUS AREA

 11 UD        SCS DIMENSIONLESS UNITGRAPH
                   TLAG        0.29  LAG
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                                                                    ***

                                                          UNIT HYDROGRAPH
                                                     19 END-OF-PERIOD ORDINATES
          68.      222.      410.      467.      416.      313.      196.      129.       88.       58.
          38.       25.       17.       11.        7.        5.        4.        2.        1.

    ***            ***            ***            ***            ***

                    , HYDROGRAPH AT STATION   INFLOW

   TOTAL RAINFALL =    2.34, TOTAL LOSS =    1.89, TOTAL EXCESS =    0.45

 PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
   (CFS)       (HR)                    6-HR       24-HR       72-HR     20.75-HR
     84.      10.75        (CFS)       20.          7.          7.           7.
                         (INCHES)     0.573       0.699       0.699        0.699
                          (AC-FT)      10.         12.         12.          12.

                         CUMULATIVE AREA =    0.32 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** **


            **************
            *            *
  12 KK     *      DAM   *
            *            *
            **************

  13 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           1  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

  14 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
                        ITYP        STOR  TYPE OF INITIAL CONDITION
                      RSVRIC       -1.00  INITIAL CONDITION
                           X        0.00 WORKING R AND D COEFFICIENT

  15 SA               AREA         0.0      21.6      28.3

  16 SE          ELEVATION     8119.00   8131.00   8132.10

  17 SS          SPILLWAY
                        CREL     8129.90  SPILLWAY CREST ELEVATION
                       SPWID        0.00  SPILLWAY WIDTH
                        COQW        0.00  WEIR COEFFICIENT
                        EXPW        1.50  EXPONENT OF HEAD

  18 ST          TOP OF DAM
                       TOPEL     8132.10  ELEVATION AT TOP OF DAM
                      DAMWID      510.00  DAM WIDTH
                        COQD        2.80  WEIR COEFFICIENT
                        EXPD        1.50  EXPONENT OF HEAD

     SW          DAM WIDTH        0.00     20.00    230.00    275.00    785.00
     SE          ELEVATION     8129.90   8130.40   8131.50   8132.10   8132.10

                                                                    ***

                                                  COMPUTED STORAGE-ELEVATION DATA

           STORAGE       0.00     86.40    113.76
         ELEVATION    8119.00   8131.00   8132.10

                                                  COMPUTED OUTFLOW-ELEVATION DATA

                                                   (EXCLUDING FLOW OVER DAM)

           OUTFLOW       0.00      0.00
         ELEVATION    8119.00   8129.90

                                                COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

                                                   (INCLUDING FLOW OVER DAM)
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STORAGE	0.00	64.75	86.40	113.76
OUTFLOW	0.00	0.00	109.58	992.37
ELEVATION	8119.00	8129.90	8131.00	8132.10

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HYDROGRAPH AT STATION DAM

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAG
1		0000	1	0.	66.6	8130.0	1		0700	85	0.	66.6	8130.0	1		1400	169	6.	73.2	8130.
1		0005	2	0.	66.6	8130.0	1		0705	86	0.	66.6	8130.0	1		1405	170	6.	73.2	8130.
1		0010	3	0.	66.6	8130.0	1		0710	87	0.	66.6	8130.0	1		1410	171	7.	73.3	8130.
1		0015	4	0.	66.6	8130.0	1		0715	88	0.	66.6	8130.0	1		1415	172	7.	73.3	8130.
1		0020	5	0.	66.6	8130.0	1		0720	89	0.	66.6	8130.0	1		1420	173	7.	73.4	8130.
1		0025	6	0.	66.6	8130.0	1		0725	90	0.	66.6	8130.0	1		1425	174	7.	73.4	8130.
1		0030	7	0.	66.6	8130.0	1		0730	91	0.	66.6	8130.0	1		1430	175	7.	73.4	8130.
1		0035	8	0.	66.6	8130.0	1		0735	92	0.	66.6	8130.0	1		1435	176	7.	73.5	8130.
1		0040	9	0.	66.6	8130.0	1		0740	93	0.	66.6	8130.0	1		1440	177	7.	73.5	8130.
1		0045	10	0.	66.6	8130.0	1		0745	94	0.	66.6	8130.0	1		1445	178	7.	73.5	8130.
1		0050	11	0.	66.6	8130.0	1		0750	95	0.	66.6	8130.0	1		1450	179	7.	73.5	8130.
1		0055	12	0.	66.6	8130.0	1		0755	96	0.	66.6	8130.0	1		1455	180	7.	73.6	8130.
1		0100	13	0.	66.6	8130.0	1		0800	97	0.	66.6	8130.0	1		1500	181	7.	73.6	8130.
1		0105	14	0.	66.6	8130.0	1		0805	98	0.	66.6	8130.0	1		1505	182	7.	73.6	8130.
1		0110	15	0.	66.6	8130.0	1		0810	99	0.	66.6	8130.0	1		1510	183	7.	73.6	8130.
1		0115	16	0.	66.6	8130.0	1		0815	100	0.	66.6	8130.0	1		1515	184	7.	73.7	8130.
1		0120	17	0.	66.6	8130.0	1		0820	101	0.	66.6	8130.0	1		1520	185	7.	73.7	8130.
1		0125	18	0.	66.6	8130.0	1		0825	102	0.	66.6	8130.0	1		1525	186	7.	73.7	8130.
1		0130	19	0.	66.6	8130.0	1		0830	103	0.	66.6	8130.0	1		1530	187	7.	73.7	8130.
1		0135	20	0.	66.6	8130.0	1		0835	104	0.	66.6	8130.0	1		1535	188	7.	73.7	8130.
1		0140	21	0.	66.6	8130.0	1		0840	105	0.	66.6	8130.0	1		1540	189	7.	73.8	8130.
1		0145	22	0.	66.6	8130.0	1		0845	106	0.	66.6	8130.0	1		1545	190	7.	73.8	8130.
1		0150	23	0.	66.6	8130.0	1		0850	107	0.	66.6	8130.0	1		1550	191	8.	73.8	8130.
1		0155	24	0.	66.6	8130.0	1		0855	108	0.	66.6	8130.0	1		1555	192	8.	73.8	8130.
1		0200	25	0.	66.6	8130.0	1		0900	109	0.	66.6	8130.0	1		1600	193	8.	73.8	8130.
1		0205	26	0.	66.6	8130.0	1		0905	110	0.	66.6	8130.0	1		1605	194	8.	73.8	8130.
1		0210	27	0.	66.6	8130.0	1		0910	111	0.	66.6	8130.0	1		1610	195	8.	73.8	8130.
1		0215	28	0.	66.6	8130.0	1		0915	112	0.	66.6	8130.0	1		1615	196	8.	73.8	8130.
1		0220	29	0.	66.6	8130.0	1		0920	113	0.	66.6	8130.0	1		1620	197	8.	73.8	8130.
1		0225	30	0.	66.6	8130.0	1		0925	114	0.	66.6	8130.0	1		1625	198	8.	73.8	8130.
1		0230	31	0.	66.6	8130.0	1		0930	115	0.	66.6	8130.0	1		1630	199	8.	73.8	8130.
1		0235	32	0.	66.6	8130.0	1		0935	116	0.	66.6	8130.0	1		1635	200	8.	73.8	8130.
1		0240	33	0.	66.6	8130.0	1		0940	117	0.	66.6	8130.0	1		1640	201	8.	73.8	8130.
1		0245	34	0.	66.6	8130.0	1		0945	118	0.	66.6	8130.0	1		1645	202	8.	73.8	8130.
1		0250	35	0.	66.6	8130.0	1		0950	119	0.	66.6	8130.0	1		1650	203	8.	73.8	8130.
1		0255	36	0.	66.6	8130.0	1		0955	120	0.	66.6	8130.0	1		1655	204	8.	73.8	8130.
1		0300	37	0.	66.6	8130.0	1		1000	121	0.	66.6	8130.0	1		1700	205	8.	73.8	8130.
1		0305	38	0.	66.6	8130.0	1		1005	122	0.	66.6	8130.0	1		1705	206	8.	73.8	8130.
1		0310	39	0.	66.6	8130.0	1		1010	123	0.	66.6	8130.0	1		1710	207	8.	73.8	8130.
1		0315	40	0.	66.6	8130.0	1		1015	124	0.	66.6	8130.0	1		1715	208	8.	73.8	8130.
1		0320	41	0.	66.6	8130.0	1		1020	125	0.	66.6	8130.0	1		1720	209	8.	73.8	8130.
1		0325	42	0.	66.6	8130.0	1		1025	126	0.	66.7	8130.0	1		1725	210	8.	73.8	8130.
1		0330	43	0.	66.6	8130.0	1		1030	127	0.	66.8	8130.0	1		1730	211	8.	73.8	8130.
1		0335	44	0.	66.6	8130.0	1		1035	128	0.	67.1	8130.0	1		1735	212	8.	73.8	8130.
1		0340	45	0.	66.6	8130.0	1		1040	129	0.	67.5	8130.1	1		1740	213	8.	73.8	8130.
1		0345	46	0.	66.6	8130.0	1		1045	130	1.	68.1	8130.1	1		1745	214	8.	73.8	8130.
1		0350	47	0.	66.6	8130.0	1		1050	131	1.	68.6	8130.1	1		1750	215	8.	73.8	8130.
1		0355	48	0.	66.6	8130.0	1		1055	132	1.	69.2	8130.1	1		1755	216	8.	73.8	8130.
1		0400	49	0.	66.6	8130.0	1		1100	133	2.	69.6	8130.2	1		1800	217	8.	73.8	8130.
1		0405	50	0.	66.6	8130.0	1		1105	134	2.	70.0	8130.2	1		1805	218	7.	73.8	8130.
1		0410	51	0.	66.6	8130.0	1		1110	135	2.	70.2	8130.2	1		1810	219	7.	73.8	8130.
1		0415	52	0.	66.6	8130.0	1		1115	136	2.	70.4	8130.2	1		1815	220	7.	73.7	8130.
1		0420	53	0.	66.6	8130.0	1		1120	137	3.	70.6	8130.2	1		1820	221	7.	73.7	8130.
1		0425	54	0.	66.6	8130.0	1		1125	138	3.	70.7	8130.2	1		1825	222	7.	73.7	8130.
1		0430	55	0.	66.6	8130.0	1		1130	139	3.	70.8	8130.2	1		1830	223	7.	73.7	8130.
1		0435	56	0.	66.6	8130.0	1		1135	140	3.	71.0	8130.2	1		1835	224	7.	73.7	8130.
1		0440	57	0.	66.6	8130.0	1		1140	141	3.	71.1	8130.2	1		1840	225	7.	73.7	8130.
1		0445	58	0.	66.6	8130.0	1		1145	142	3.	71.2	8130.2	1		1845	226	7.	73.7	8130.
1		0450	59	0.	66.6	8130.0	1		1150	143	3.	71.3	8130.3	1		1850	227	7.	73.7	8130.
1		0455	60	0.	66.6	8130.0	1		1155	144	4.	71.4	8130.3	1		1855	228	7.	73.7	8130.
1		0500	61	0.	66.6	8130.0	1		1200	145	4.	71.5	8130.3	1		1900	229	7.	73.7	8130.
1		0505	62	0.	66.6	8130.0	1		1205	146	4.	71.6	8130.3	1		1905	230	7.	73.6	8130.
1		0510	63	0.	66.6	8130.0	1		1210	147	4.	71.7	8130.3	1		1910	231	7.	73.6	8130.
1		0515	64	0.	66.6	8130.0	1		1215	148	4.	71.8	8130.3	1		1915	232	7.	73.6	8130.
1		0520	65	0.	66.6	8130.0	1		1220	149	4.	71.9	8130.3	1		1920	233	7.	73.6	8130.
1		0525	66	0.	66.6	8130.0	1		1225	150	4.	72.0	8130.3	1		1925	234	7.	73.6	8130.
1		0530	67	0.	66.6	8130.0	1		1230	151	5.	72.0	8130.3	1		1930	235	7.	73.5	8130.
1		0535	68	0.	66.6	8130.0	1		1235	152	5.	72.1	8130.3	1		1935	236	7.	73.5	8130.
1		0540	69	0.	66.6	8130.0	1		1240	153	5.	72.2	8130.3	1		1940	237	7.	73.5	8130.

1	0545	70	0.	66.6	8130.0	*	1	1245	154	5.	72.3	8130.3	*	1	1945	238	7.	73.5	8130.
1	0550	71	0.	66.6	8130.0	*	1	1250	155	5.	72.4	8130.3	*	1	1950	239	7.	73.5	8130
1	0555	72	0.	66.6	8130.0	*	1	1255	156	5.	72.4	8130.3	*	1	1955	240	7.	73.4	8130.
1	0600	73	0.	66.6	8130.0	*	1	1300	157	5.	72.5	8130.3	*	1	2000	241	7.	73.4	8130.
1	0605	74	0.	66.6	8130.0	*	1	1305	158	5.	72.6	8130.3	*	1	2005	242	7.	73.4	8130.
1	0610	75	0.	66.6	8130.0	*	1	1310	159	5.	72.6	8130.3	*	1	2010	243	7.	73.4	8130.
1	0615	76	0.	66.6	8130.0	*	1	1315	160	6.	72.7	8130.3	*	1	2015	244	7.	73.4	8130.
1	0620	77	0.	66.6	8130.0	*	1	1320	161	6.	72.8	8130.3	*	1	2020	245	7.	73.4	8130.
1	0625	78	0.	66.6	8130.0	*	1	1325	162	6.	72.8	8130.3	*	1	2025	246	7.	73.3	8130.
1	0630	79	0.	66.6	8130.0	*	1	1330	163	6.	72.9	8130.3	*	1	2030	247	7.	73.3	8130.
1	0635	80	0.	66.6	8130.0	*	1	1335	164	6.	72.9	8130.3	*	1	2035	248	7.	73.3	8130.
1	0640	81	0.	66.6	8130.0	*	1	1340	165	6.	73.0	8130.3	*	1	2040	249	7.	73.3	8130.
1	0645	82	0.	66.6	8130.0	*	1	1345	166	6.	73.1	8130.3	*	1	2045	250	7.	73.3	8130.
1	0650	83	0.	66.6	8130.0	*	1	1350	167	6.	73.1	8130.3	*						
1	0655	84	0.	66.6	8130.0	*	1	1355	168	6.	73.1	8130.4	*						
						*							*						

****

PEAK OUTFLOW IS 8. AT TIME 16.42 HOURS

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	20.75-HR
8.	16.42	(CFS)	7.	3.	3.	3.
		(INCHES)	0.213	0.310	0.310	0.310
		(AC-FT)	4.	5.	5.	5.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	20.75-HR
74.	16.42	74.	70.	70.	70.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	20.75-HR
8130.39	16.42	8130.38	8130.17	8130.17	8130.17

CUMULATIVE AREA = 0.32 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	INFLOW	84.	10.75	20.	7.	7.	0.32		
ROUTED TO	DAM	8.	16.42	7.	3.	3.	0.32	8130.39	16.42

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	8130.00	8129.90	8132.10
STORAGE	67.	65.	114.
OUTFLOW	0.	0.	992.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	8130.39	0.00	74.	8.	0.00	16.42	0.00

*** NORMAL END OF HEC-1 ***

ANTELOPE DITCH NO 1

WATER DISTRICT: 47
ID NUMBER: 1012
SOURCE: ANTELOPE CK of POTTER CK of ILLINOIS RIVER at Stream Mile 43.20
LOCATION: NW SW SECTION 24 TOWNSHIP 8 N RANGE 80 W IN JACKSON COUNTY
MEASURING DEVICE/RECORDER: NONE
CONTACT: USA NWR (OWNER)
ADDRESS: WALDEN COLO
COMMENTS: NOW IRRIGATED BY HUBBARD #2 AND #4

WATER RIGHTS INFORMATION

AdminNumber	ADJ DATE	APPRO DATE	COURT NO	DECREED AMT	USES	COMMENTS
30280.21305	06/20/1939	05/01/1908	707	5.4710 CFS	18	CHG .029 TO WELL W487(ID 5024). AMEND LEGAL DESCRIPTION 87CW97

DECREE SOURCE INFORMATION

PRIORITY	BOOK	PAGE	CANO	COMMENTS
707	3	589	286	

DIVERSION SUMMARY IN ACRE FEET - TOTAL WATER THROUGH STRUCTURE [All Years]

YEAR	FDU	LDU	DWC	MAXQ & DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL
1972	05/01	07/10	71	5.50 05/01							338	327	109				775
1974	05/01	06/30	61	5.50 05/01							338	327					665
1976	04/01	10/30	213	10.0 04/01						595	307	119	123	123	119	119	1505
95	Water Taken in Another Structure																
96	Water Taken in Another Structure																
	04/21	08/13	115	10.0						198	328	258	77.4	41.0	39.7	39.7	982
																(4.30 CFS)	

USES: 1=IRR 2=MUN 3=COM 4=IND 5=REC 6=FISH 7=FIRE 8=DOM 9=STOCK O=OTHER A=AUG H=INHOUSE K=SNOWMAKING M=MINFLOW P=POWER W=WILDLIFE

ANTELOPE SPRING NO 2

WATER DISTRICT: 47
ID NUMBER: 1092
SOURCE: ANTELOPE CK of POTTER CK of ILLINOIS RIVER
LOCATION: NW SW SECTION 24 TOWNSHIP 8 N RANGE 80 W IN JACKSON COUNTY
CONTACT: USA BLM (CLAIMANT)
ADDRESS:

WATER RIGHTS INFORMATION

AdminNumber	ADJ DATE	APPRO DATE	COURT NO	DECREED AMT	USES	COMMENTS
49673.48120	12/31/1986	09/30/1981	86CW 8	0.0100 CFS	90	stock & other

No Annual Diversion Summary Records Were Found For This Structure

HUBBARD DITCH 2

WATER DISTRICT: 47
ID NUMBER: 674
SOURCE: ILLINOIS RIVER at Stream Mile 50.71
LOCATION: SE SE SECTION 29 TOWNSHIP 8 N RANGE 79 W IN JACKSON COUNTY
IRRIGATED ACRES: 1343
MEASURING DEVICE/RECORDER: 7 FT PF METAL
CONTACT: USA NWR
ADDRESS: WALDEN COLO

WATER RIGHTS INFORMATION

AdminNumber	ADJ DATE	APPRO DATE	COURT NO	DECREED AMT	USES	COMMENTS
14337.00000	09/19/1892	04/02/1889	167(151)	3.0000 CFS	1	
14731.00000	09/19/1892	05/01/1890	217(196)	3.0000 CFS	1	
15891.00000	04/23/1902	07/04/1893	264(253)	8.0000 CFS	1	
17420.00000	04/23/1902	09/10/1897	286(273)	15.00 CFS	1	
21366.19909	01/06/1913	07/05/1904	346.5	16.00 CFS	1	
21391.00000	01/06/1913	07/26/1908	357	27.00 CFS	1	
23016.22035	03/06/1923	05/01/1910	378.5	31.00 CFS	1	
				103.0 CFS TOTAL ABSOLUTE		

DECREE SOURCE INFORMATION

PRIORITY	BOOK	PAGE	CANO	COMMENTS
217(196)	1	123	922	
167(151)	1	123	922	
264(253)	1	233	1519	
286(273)	1	233	1519	
357	2	374	2891	
346.5	2	395	2891	
378.5	3	418	3571	
346.5	3	464	3571	MADE ABSOLUTE

DIVERSION SUMMARY IN ACRE FEET - TOTAL WATER THROUGH STRUCTURE [All Years]

YEAR	FDU	LDU	DWC	MAXQ & DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL
51 SEPT 1-6", TURNED DOWN TO 1 CU FT																	
1954	05/13	06/15	12	10.0 05/22							104	35.7					140
54 NUC=X - SEE COMMISSIONERS REPORT FOR EXACT FIGURES																	
1955	05/25	07/02	16	31.0 06/25							85.6	394	14.2				493
1959	06/21	06/29	4	10.5 06/26								59.5					60
59 NUC=X - SEE COMMISSIONERS REPORT FOR EXACT FIGURES																	

1963	05/15	06/03	4	32.0	06/03		61.5	63.5			125
63	NUC=X - APPROXIMATE AMOUNT FOR 05/23										
1970	05/01	07/09	70	52.0	05/01		3197	3094	928		7220
1971	05/05	07/14	71	40.0	05/10		2043	2380	1111		5534
71	INCLUDES ENLARGEMENT.										
1972	04/10	06/29	81	15.0	04/11	599	922	863			2384
72	INCLUDES ENLARGEMENT.										
1973	05/18	08/27	102	87.0	05/18		2416	3868	2229	1941	10455

WATER DISTRICT 47 ID = 674 HUBBARD DITCH 2

PAGE 2 DIVERSION SUMMARY IN ACRE FEET - TOTAL WATER THROUGH STRUCTURE [All Years]

YEAR	FDU	LDU	DWC	MAXQ	& DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL
1974	04/24	07/26	94	106	04/24						1475	4954	2380	2003				10812
1975	04/29	07/09	72	28.5	05/16						63.1	1441	1696	509				3708
1976	04/12	08/01	112	19.6	04/12						403	338	327	338	7.93			1415
1977	04/01	07/31	101	28.0	04/13						887	572	923	272				2654
77	EXCESS WATER GOES INTO HUBBARD #4																	
1978	04/06	07/19	105	30.3	05/17						471	1326	1593	348				3739
1979	05/02	09/30	152	53.6	06/11							1325	2638	400	307	298		4968
1980	05/16	06/30	46	9.23	05/21							251	532					783
1981	05/28	06/14	18	15.0	05/28							119	417					536
1982	04/14	10/14	184	62.4	06/01						1004	2302	1953	1071	664	643	300	7937
1983	05/03	10/19	170	42.6	05/13							1440	898	877	391	244	135	3986
1984	05/01	10/16	169	52.0	05/01							2848	2240	342	252	244	130	6057
1985	04/11	09/02	145	37.5	05/08						793	2063	1449	922	579	15.9		5823
1986	04/16	09/21	159	56.6	06/11						705	1467	2251	924	566	280		6194
1987	04/01	10/31	131	19.0	04/01						922	651	381			108	75.4	2137
1988	04/28	10/31	109	56.0	06/13						77.4	2339	2666	563	125		15.9	5786
1989	03/27	07/08	104	37.5	03/27					372	1562	491	692	109				3226
1990	04/28	10/31	114	56.0	06/13						77.4	2339	2666	563	125		35.7	5806
1991	04/29	08/26	120	85.0	06/04						5.95	1834	3289	688	420			6237
1992	03/05	08/19	161	30.0	05/28					208	365	746	932	415	179			2844
92	PARSHALL FLUME SUBMERGED																	
1993	03/08	08/23	169	40.0	04/27					238	839	1624	1359	813	303			5177
1994	03/31	10/31	117	28.0	05/19					9.92	712	1585	882	43.6			11.9	3244
1995	03/22	09/05	168	20.0	06/01					39.7	125	377	1190	1059	345	9.92		3146
1996	04/25	07/15	82	5.00	05/16						35.7	278	194	59.5				567
1997	04/11	08/31	143	40.0	05/16						119	2311	1785	565	307			5088
1998	03/25	09/21	181	12.0	04/15					111	603	615	357	246	246	167		2344
	04/21	08/17	106	106						29.7	359	1347	1408	528	205	60.9	21.3	3958
																	(18.9 CFS)	

FILING MAPS AVAILABLE IN STATE ENGINEERS OFFICE

S E FILING NO	WD	TITLE	DATE
10	47	HUBBARD DITCH NO. 2	1888
192	47	HUBBARD NO. 2 DITCH (ENLARGED)	1897

USES: 1=IRR 2=MUN 3=COM 4=IND 5=REC 6=FISH 7=FIRE 8=DOM 9=STOCK 0=OTHER A=AUG H=INHOUSE K=SNOWMAKING M=MINFLOW P=POWER W=WILDLIFE

HUBBARD DITCH 4

WATER DISTRICT: 47
ID NUMBER: 675
SOURCE: ILLINOIS RIVER
LOCATION: SW NW SECTION 24 TOWNSHIP 8 N RANGE 80 W IN JACKSON COUNTY
MEASURING DEVICE/RECORDER: NONE
CONTACT: USA NWR
ADDRESS: WALDEN COLO
COMMENTS: THIS IS AN EXTENSION OF THE HUBBARD #2

WATER RIGHTS INFORMATION

AdminNumber	ADJ DATE	APPRO DATE	COURT NO	DECREED AMT	USES	COMMENTS
23016.21383	03/06/1923	07/18/1908	NONE	2.0000 CFS	1	DECREED AS #4. FROM SEEPAGE & SPRINGS

DECREE SOURCE INFORMATION

PRIORITY	BOOK	PAGE	CANO	COMMENTS
NONE	3	454	3571	

DIVERSION SUMMARY IN ACRE FEET - TOTAL WATER THROUGH STRUCTURE [All Years]

YEAR	FDU	LDU	DWC	MAXQ & DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL
1970	05/01	07/09	70	1.00 05/01							61.5	59.5	17.9				139
1973	04/01	10/31	214	2.00 04/01						119	123	119	123	123	119	123	849
1974	04/01	09/12	165	2.00 04/01						119	123	119	123	123	47.6		655
1975	05/01	08/30	122	2.00 05/01							123	119	123	119			484
76	EST. ANNUAL USE WILDLIFE REFUGE																
1977	04/08	07/15	99	0.250 04/08						11.4	15.4	14.9	7.44				49
77	PICKS UP HUBBARD #2 WASTE WATER																
79	IRRIGATED WITH HUBBARD #2 WATER																
84	ACRES TABULATED WITH HUBBARD #2																
87	THIS IS AN EXTENSION OF THE HUBBARD #2																
88	EXTENSION FROM HUBBARD #2																
89	EXTENTION OF AND TALBULATED WITH HUBBARD D. #2																
1990	04/28	08/10	105	56.0 06/13						77.4	2339	2666	563	125			5770
91	Water Taken in Another Structure - EXTENSION OF HUBBARD #2																
92	Water Taken but No Data Available																
1993	03/08	08/23	169	2.50 03/08					119	119	61.5	59.5	61.5	45.6			466
94	Water Taken in Another Structure																
95	Water Taken in Another Structure																
96	Water Taken in Another Structure																
97	Water Taken in Another Structure																

98 Water Taken in Another Structure

04/11	08/22	135	56.0	17.0	63.7	407	451	146	76.5	23.8	17.6	1202 (4.49 CFS)

FILING MAPS AVAILABLE IN STATE ENGINEERS OFFICE

S E FILING NO	WD	TITLE	DATE
10460	47	HUBBARD DITCH NO. 4	1913

CASE RES NO 1

WATER DISTRICT: 47
ID NUMBER: 3600
SOURCE: ANTELOPE CK of POTTER CK of ILLINOIS RIVER at Stream Mile 42.29
LOCATION: SW SE SECTION 13 TOWNSHIP 8 N RANGE 80 W IN JACKSON COUNTY
ESTIMATED CAPACITY: 150.0
CONTACT: USA NWR
ADDRESS: WALDEN COLO

WATER RIGHTS INFORMATION

AdminNumber	ADJ DATE	APPRO DATE	COURT NO	DECREED AMT	USES	COMMENTS
30280.21391	06/20/1939	07/26/1908	11	124.3 AF	1	

DECREE SOURCE INFORMATION

PRIORITY	BOOK	PAGE	CANO	COMMENTS
11	3	621	286	

DAM INFORMATION

Dam Id: 470114
Dam Size: SMALL
Dam Height: 12.0 FT
Dam Length: 450 FT
Type: EARTH
Hazard Class: 3
Elevation: 8132 FT
Crest Width: 9.0 FT
Upstream Slope:
Downstream Slope:
Capacity: 117 ACRE-FT
Surface Area: 35 ACRES
Freeboard: 2.0 FT
Drainage: 192 ACRES
Spillway Width: 20.0 FT
Spillway Q: 149 CFS
Outlet description: 18" CMP
Outlet capacity: 10 CFS
Filing No:
Last Inspection:07/18/1989
Remarks: POOR CONDITION; INSPECTED BY U.S.FISH & WILDLIFE

OWNER/CONTACT INFORMATION:

U. S. FISH & WILDLIFE SERVICE (Owner)
MARSHAL D. FOX, CHIEF CONST.&DAM SAFETY (Contact)
P.O. BOX 25486 DENVER FEDERAL CTR.
DENVER, CO 80225
Phone: 236-5321

RESERVOIR STORAGE DATA IN ACRE-FT FROM FILE E:\DWR6\WCDATA\R47F

DATE	GAGE HT	STORAGE	FILL	RELEASE	EVAPORATION

04/23/1974	0.0	
05/20/1974	70	
08/05/1974	36	
11/01/1974	51	
05/12/19750.0	0.0	
10/03/1975	117	117
06/01/1976	117	
07/26/1976	51	
10/22/1976	0.0	

WATER DISTRICT 47 ID = 3600 CASE RES NO 1
PAGE 2

RESERVOIR STORAGE DATA IN ACRE-FT FROM FILE E:\DWR6\WCDATA\R47F

DATE	GAGE HT	STORAGE	FILL	RELEASE	EVAPORATION
04/08/1977		0.0			
04/30/1977		117	117		
09/30/1977		0.0		117	
11/01/1977		0.0			
04/01/1978		0.0			
04/30/1978		117	117		
10/31/1978		0.0		117	
11/01/1978		0.0			
06/01/1979		117	117		
10/31/1979		0.0		117	
11/01/1979		0.0			
06/01/1980		117	1170		
09/01/1980		117			
09/30/1980		0.0		1170	
11/01/1980		0.0			
04/30/1981		117	117		
06/01/1981		0.0		117	
10/31/1981		0.0			
11/01/1981		0.0			
05/01/1982		117	117		
10/01/1982		117			
11/01/1982		117			
04/01/1983		0.0		117	
10/01/1983		81	81		
11/03/1983		81			
05/10/1984		0.0		81	
10/19/1984		92	92		
05/10/1985		36			
09/06/1985		0.0			
11/01/1985		92			
12/01/1985		0.0			
05/21/1986		24	24		
08/01/1986		0.0		24	
11/01/1986		0.0			
11/01/1988		0.0			
07/27/19895		36	36		
10/31/19894		24			12
11/01/1989		124			
11/01/1990		117			
12/01/1990		30		87	
04/15/19914.5		30			

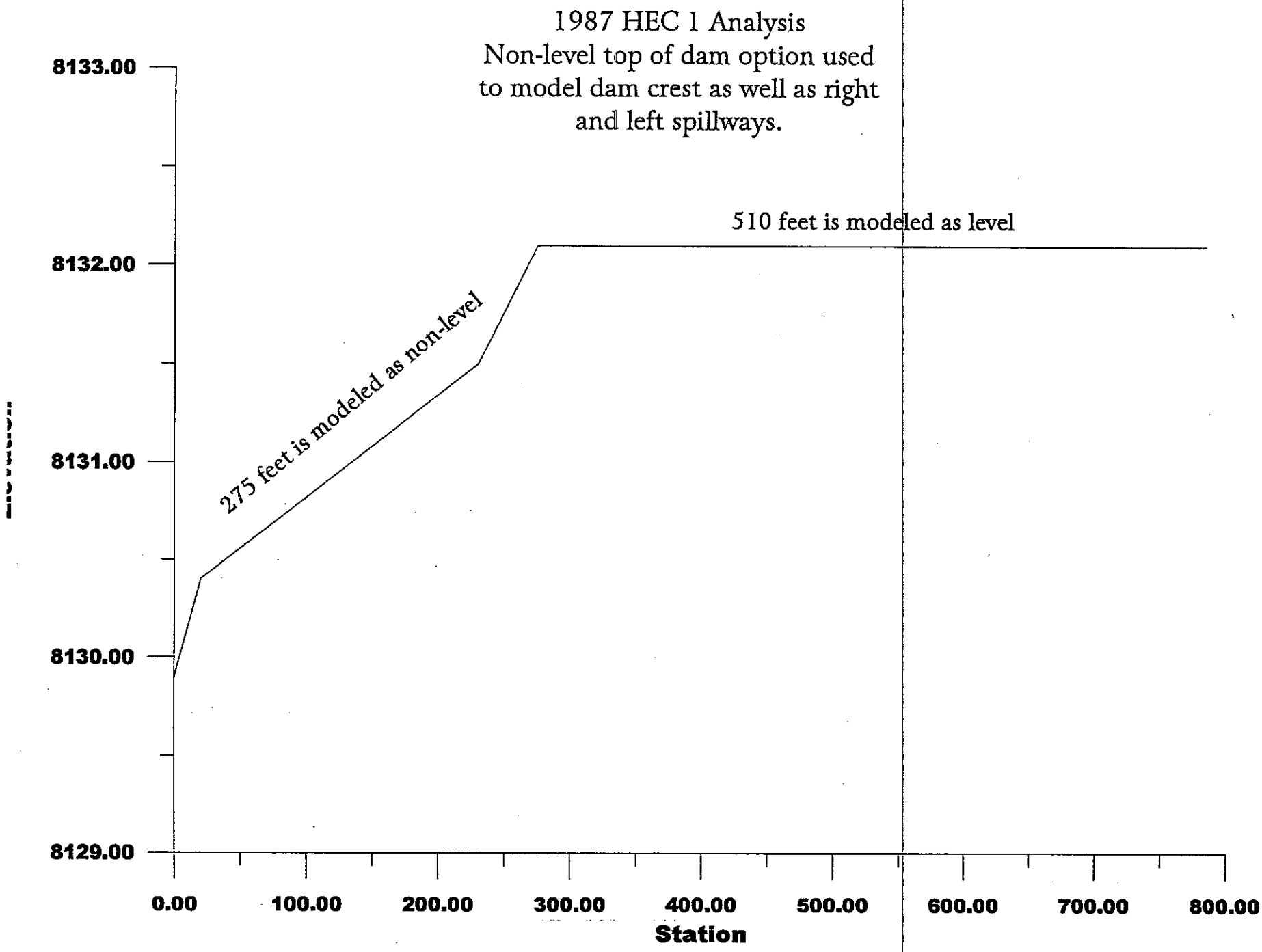
05/10/19918.6	107	77		
05/21/19919	117	10		
11/01/19919	117			
04/09/19921.8	5		112	
05/05/19926.3	57	52		
06/20/19929	117	60		
10/02/19925.2	39			78
05/16/19936.1	53			
07/21/19936.7	64	11		

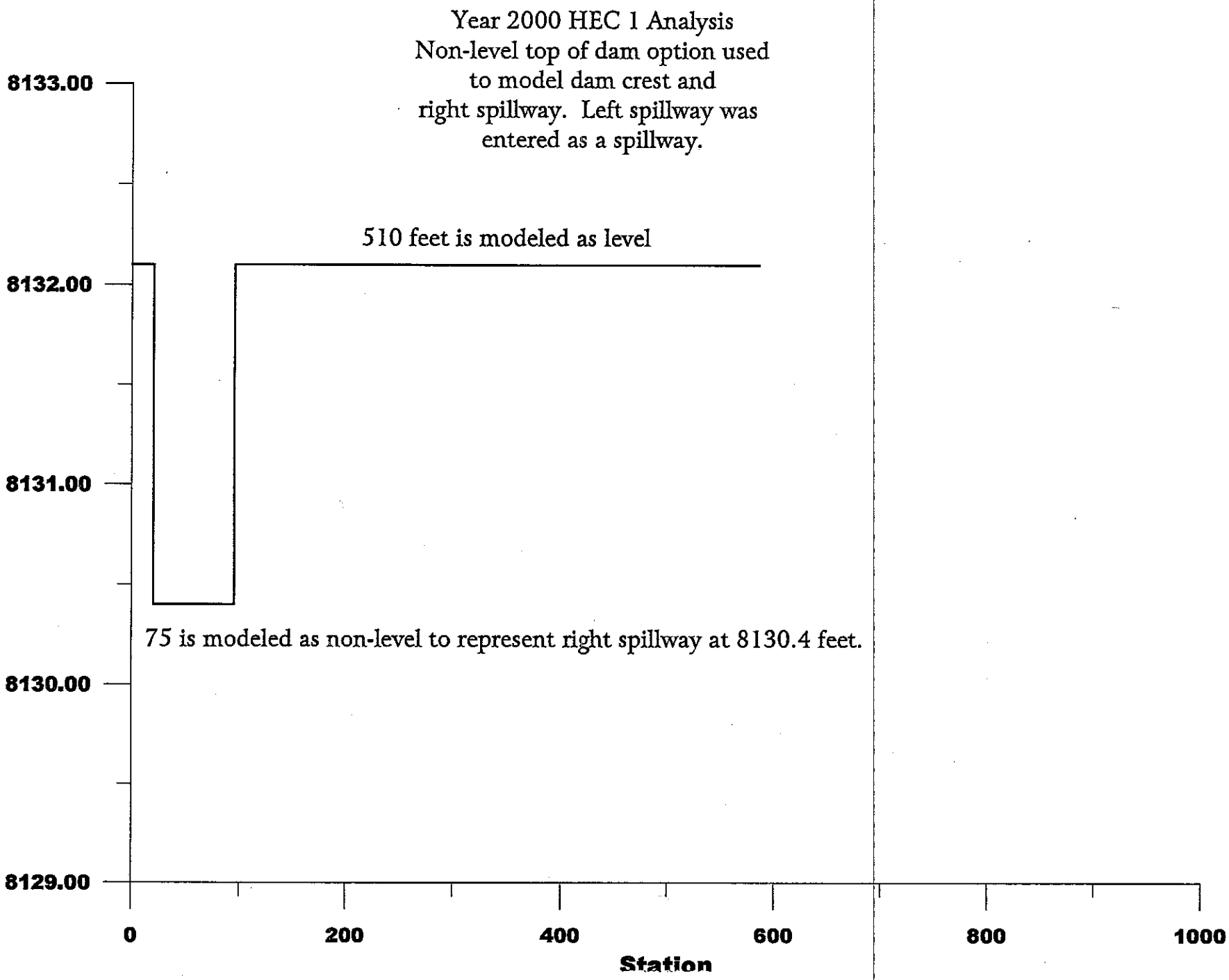
WATER DISTRICT 47 ID = 3600 CASE RES NO 1

RESERVOIR STORAGE DATA IN ACRE-FT FROM FILE E:\DWR6\WCDATA\R47F

DATE	GAGE HT	STORAGE	FILL	RELEASE	EVAPORATION
09/26/1993	6.5	61			3
11/01/1993		61			
05/01/1994				61	
05/18/1994	7	70	70		
06/02/1994	7.5	81	11		
10/31/1994	5.5	43.5		20	17.5
11/01/1994	5.5	43.5			
04/01/1995	6.5	60.5	17		
04/11/1995	8.3	99.5	39		
04/21/1995	8.3	99.5			
07/15/1995	8	92		5.5	2
10/03/1995	7.5	81		6	5
11/01/1995		81			
04/20/1996		124			
10/12/1996		72			
11/01/1996		72			
05/11/1997		72			
10/02/1997		72			
11/01/1997		72			
05/06/1998		51			21
07/15/1998		117	66		
10/12/1998		70			47

USES: 1=IRR 2=MUN 3=COM 4=IND 5=REC 6=FISH 7=FIRE 8=DOM 9=STOCK 0=OTHER A=AUG H=INHOUSE K=SNOWMAKING M=MINFLOW P=POWER W=WILDLIFE


1987 HEC 1 Analysis
Non-level top of dam option used
to model dam crest as well as right
and left spillways.
510 feet is modeled as level
275 feet is modeled as non-level
8133.00
8132.00
8131.00
8130.00
8129.00
0.00
100.00
200.00
300.00
400.00
500.00
600.00
700.00
800.00
Station


Year 2000 HEC 1 Analysis
Non-level top of dam option used
to model dam crest and
right spillway. Left spillway was
entered as a spillway.
510 feet is modeled as level
75 is modeled as non-level to represent right spillway at 8130.4 feet.
8133.00
8132.00
8131.00
8130.00
8129.00
0
200
400
600
800
1000
Station

```
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *              JUN   1998              *
 *           VERSION 4.1                *
 *                                      *
 *  RUN DATE   20DEC00  TIME  14:57:32  *
 *                                      *
 ****************************************
```

```
*************
*
*    U.S. ARM
*    HYDROLOG
*          60
*       DAVIS
*           (
*
*************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, A

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-ST
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE F
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE F
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......

   1          ID  Case No. 1 Reservoir Analysis - 100-year, 6-hour duration flood
   2          ID   Res full to spillway crest, no low-level outlet works
   3          IT       5       0       0     300
   4          IO       4

   5          KK  INFLOW
   6          BA    0.32
   7          BF     -.5    -.25     1.2
   8          PH       1              .42     .82    1.44    1.53    1.61    1.80
   9          LS              72
  10          UD     .60
```

```
          11          KK    DAM
          12          KO       1
          13          RS       1    ELEV  8129.9
          14          SA       0    21.6    28.3
          15          SE    8119  8129.9  8132.1
          16          SS  8129.9     200     3.0     1.5
          17          ST  8132.1     585     2.8     1.5
          18          SW       0      20      20      95      95     585
          19          SE  8132.1  8132.1  8130.4  8130.4  8132.1  8132.1
          20          ZZ
1*****************************************                                                  *************
 *                                       *                                                  *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                  *    U.S. ARM
 *              JUN   1998               *                                                  *    HYDROLOG
 *           VERSION 4.1                 *                                                  *          60
 *                                       *                                                  *       DAVIS
 *  RUN DATE   20DEC00  TIME  14:57:32   *                                                  *           (
 *                                       *                                                  *
 *****************************************                                                  *************


                        Case No. 1 Reservoir Analysis - 100-year, 6-hour duration flood
                         Res full to spillway crest, no low-level outlet works

   4 IO          OUTPUT CONTROL VARIABLES
                       IPRNT           4  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1    0  STARTING DATE
                       ITIME        0000  STARTING TIME
                          NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      2    0  ENDING DATE
                      NDTIME        0055  ENDING TIME
                      ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.92 HOURS

         ENGLISH UNITS
              DRAINAGE AREA          SQUARE MILES
              PRECIPITATION DEPTH    INCHES
              LENGTH, ELEVATION      FEET
```

```
          FLOW                    CUBIC FEET PER SECOND
          STORAGE VOLUME          ACRE-FEET
          SURFACE AREA            ACRES
          TEMPERATURE             DEGREES FAHRENHEIT


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *

          **************
          *            *
  5 KK    *    INFLOW  *
          *            *
          **************

          SUBBASIN RUNOFF DATA

  6 BA        SUBBASIN CHARACTERISTICS
                   TAREA          .32  SUBBASIN AREA

  7 BF        BASE FLOW CHARACTERISTICS
                   STRTQ          .16  INITIAL FLOW
                   QRCSN         -.25  BEGIN BASE FLOW RECESSION
                   RTIOR      1.20000  RECESSION CONSTANT

              PRECIPITATION DATA

  8 PH                                DEPTHS FOR   1-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ......
              5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  1
                .42     .82    1.44    1.53    1.61    1.80     .00     .00     .00     .00     .00

                                                  STORM AREA =      .32

  9 LS        SCS LOSS RATE
                   STRTL          .78  INITIAL ABSTRACTION
                  CRVNBR        72.00  CURVE NUMBER
                   RTIMP          .00  PERCENT IMPERVIOUS AREA

 10 UD        SCS DIMENSIONLESS UNITGRAPH
                    TLAG          .60  LAG

                                                          ***

                                                   UNIT HYDROGRAPH
                                              38 END-OF-PERIOD ORDINATES
           12.       37.       72.      122.      178.      219.      239.      240.      229.
          181.      147.      114.       91.       74.       61.       49.       40.       32.
```

```
                21.       17.       14.       11.        9.        7.        6.        5.        4.
                 3.        2.        2.        1.        1.        1.        0.        0.

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *

          **************
          *            *
 11 KK    *      DAM   *
          *            *
          **************

 12 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

             HYDROGRAPH ROUTING DATA

 13 RS          STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC     8129.90  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

 14 SA              AREA          .0      21.6      28.3

 15 SE          ELEVATION     8119.00   8129.90   8132.10

 16 SS          SPILLWAY
                      CREL     8129.90  SPILLWAY CREST ELEVATION
                     SPWID      200.00  SPILLWAY WIDTH
                      COQW        3.00  WEIR COEFFICIENT
                      EXPW        1.50  EXPONENT OF HEAD

 17 ST          TOP OF DAM
                     TOPEL     8132.10  ELEVATION AT TOP OF DAM
                    DAMWID      585.00  DAM WIDTH
                      COQD        2.80  WEIR COEFFICIENT
                      EXPD        1.50  EXPONENT OF HEAD

    SW          DAM WIDTH         .00     20.00     20.00     95.00     95.00    585.00
    SE          ELEVATION     8132.10   8132.10   8130.40   8130.40   8132.10   8132.10

                                                                  ***

                                                  COMPUTED STORAGE-ELEVATION DATA
```

STORAGE	.00	78.48	133.21
ELEVATION	8119.00	8129.90	8132.10

COMPUTED OUTFLOW-ELEVATION DATA

(EXCLUDING FLOW OVER DAM)

OUTFLOW	.00	.00	.34	2.71	9.05	21.56	42.03	72.60	1
ELEVATION	8119.00	8129.90	8129.91	8129.93	8129.96	8130.01	8130.07	8130.14	81
OUTFLOW	244.60	335.85	446.97	580.33	737.49	921.39	1133.09	1375.09	16
ELEVATION	8130.45	8130.58	8130.72	8130.88	8131.05	8131.23	8131.43	8131.64	81

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

(INCLUDING FLOW OVER DAM)

STORAGE	.00	78.48	79.07	79.80	80.85	82.19	83.85	85.82	
OUTFLOW	.00	.00	2.71	9.05	21.56	42.03	72.60	115.05	1
ELEVATION	8119.00	8129.90	8129.93	8129.96	8130.01	8130.07	8130.14	8130.23	81
STORAGE	93.81	97.21	100.99	105.18	109.82	114.91	120.48	126.57	1
OUTFLOW	335.85	446.97	580.33	737.49	921.39	1133.09	1375.09	1649.43	19
ELEVATION	8130.58	8130.72	8130.88	8131.05	8131.23	8131.43	8131.64	8131.86	81

****

HYDROGRAPH AT STATION DAM

****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD
1		0000	1	0.	78.5	8129.9	*	1		0820	101	6.	79.5	8129.9	*	1		1640	201
1		0005	2	0.	78.5	8129.9	*	1		0825	102	6.	79.5	8129.9	*	1		1645	202
1		0010	3	0.	78.5	8129.9	*	1		0830	103	6.	79.5	8129.9	*	1		1650	203
1		0015	4	0.	78.5	8129.9	*	1		0835	104	6.	79.5	8129.9	*	1		1655	204
1		0020	5	0.	78.5	8129.9	*	1		0840	105	6.	79.5	8129.9	*	1		1700	205
1		0025	6	0.	78.5	8129.9	*	1		0845	106	6.	79.5	8129.9	*	1		1705	206
1		0030	7	0.	78.5	8129.9	*	1		0850	107	6.	79.5	8129.9	*	1		1710	207
1		0035	8	0.	78.5	8129.9	*	1		0855	108	6.	79.5	8129.9	*	1		1715	208
1		0040	9	0.	78.5	8129.9	*	1		0900	109	6.	79.4	8129.9	*	1		1720	209
1		0045	10	0.	78.5	8129.9	*	1		0905	110	6.	79.4	8129.9	*	1		1725	210
1		0050	11	0.	78.5	8129.9	*	1		0910	111	5.	79.4	8129.9	*	1		1730	211
1		0055	12	0.	78.5	8129.9	*	1		0915	112	5.	79.4	8129.9	*	1		1735	212
1		0100	13	0.	78.5	8129.9	*	1		0920	113	5.	79.4	8129.9	*	1		1740	213
1		0105	14	0.	78.5	8129.9	*	1		0925	114	5.	79.4	8129.9	*	1		1745	214

1	0110	15	0.	78.5	8129.9	*	1	0930	115	5.	79.4	8129.9	*	1	1750	215
1	0115	16	0.	78.5	8129.9	*	1	0935	116	5.	79.4	8129.9	*	1	1755	216
1	0120	17	0.	78.5	8129.9	*	1	0940	117	5.	79.4	8129.9	*	1	1800	217
1	0125	18	0.	78.5	8129.9	*	1	0945	118	5.	79.3	8129.9	*	1	1805	218
1	0130	19	0.	78.5	8129.9	*	1	0950	119	5.	79.3	8129.9	*	1	1810	219
1	0135	20	0.	78.5	8129.9	*	1	0955	120	5.	79.3	8129.9	*	1	1815	220
1	0140	21	0.	78.5	8129.9	*	1	1000	121	5.	79.3	8129.9	*	1	1820	221
1	0145	22	0.	78.5	8129.9	*	1	1005	122	4.	79.3	8129.9	*	1	1825	222
1	0150	23	0.	78.5	8129.9	*	1	1010	123	4.	79.3	8129.9	*	1	1830	223
1	0155	24	0.	78.5	8129.9	*	1	1015	124	4.	79.3	8129.9	*	1	1835	224
1	0200	25	0.	78.5	8129.9	*	1	1020	125	4.	79.3	8129.9	*	1	1840	225
1	0205	26	0.	78.5	8129.9	*	1	1025	126	4.	79.3	8129.9	*	1	1845	226
1	0210	27	0.	78.5	8129.9	*	1	1030	127	4.	79.3	8129.9	*	1	1850	227
1	0215	28	0.	78.5	8129.9	*	1	1035	128	4.	79.2	8129.9	*	1	1855	228
1	0220	29	0.	78.5	8129.9	*	1	1040	129	4.	79.2	8129.9	*	1	1900	229
1	0225	30	0.	78.5	8129.9	*	1	1045	130	4.	79.2	8129.9	*	1	1905	230
1	0230	31	0.	78.5	8129.9	*	1	1050	131	4.	79.2	8129.9	*	1	1910	231
1	0235	32	0.	78.5	8129.9	*	1	1055	132	4.	79.2	8129.9	*	1	1915	232
1	0240	33	0.	78.5	8129.9	*	1	1100	133	4.	79.2	8129.9	*	1	1920	233
1	0245	34	0.	78.5	8129.9	*	1	1105	134	4.	79.2	8129.9	*	1	1925	234
1	0250	35	0.	78.5	8129.9	*	1	1110	135	4.	79.2	8129.9	*	1	1930	235
1	0255	36	0.	78.5	8129.9	*	1	1115	136	3.	79.2	8129.9	*	1	1935	236
1	0300	37	0.	78.5	8129.9	*	1	1120	137	3.	79.2	8129.9	*	1	1940	237
1	0305	38	0.	78.5	8129.9	*	1	1125	138	3.	79.2	8129.9	*	1	1945	238
1	0310	39	0.	78.5	8129.9	*	1	1130	139	3.	79.2	8129.9	*	1	1950	239
1	0315	40	0.	78.5	8129.9	*	1	1135	140	3.	79.2	8129.9	*	1	1955	240
1	0320	41	0.	78.6	8129.9	*	1	1140	141	3.	79.2	8129.9	*	1	2000	241
1	0325	42	0.	78.6	8129.9	*	1	1145	142	3.	79.1	8129.9	*	1	2005	242
1	0330	43	1.	78.7	8129.9	*	1	1150	143	3.	79.1	8129.9	*	1	2010	243
1	0335	44	2.	78.9	8129.9	*	1	1155	144	3.	79.1	8129.9	*	1	2015	244
1	0340	45	3.	79.1	8129.9	*	1	1200	145	3.	79.1	8129.9	*	1	2020	245
1	0345	46	4.	79.3	8129.9	*	1	1205	146	3.	79.1	8129.9	*	1	2025	246
1	0350	47	6.	79.5	8129.9	*	1	1210	147	3.	79.1	8129.9	*	1	2030	247
1	0355	48	7.	79.6	8130.0	*	1	1215	148	3.	79.1	8129.9	*	1	2035	248
1	0400	49	9.	79.8	8130.0	*	1	1220	149	3.	79.1	8129.9	*	1	2040	249
1	0405	50	10.	79.9	8130.0	*	1	1225	150	3.	79.1	8129.9	*	1	2045	250
1	0410	51	12.	80.0	8130.0	*	1	1230	151	3.	79.1	8129.9	*	1	2050	251
1	0415	52	12.	80.1	8130.0	*	1	1235	152	3.	79.1	8129.9	*	1	2055	252
1	0420	53	13.	80.2	8130.0	*	1	1240	153	3.	79.1	8129.9	*	1	2100	253
1	0425	54	13.	80.2	8130.0	*	1	1245	154	3.	79.1	8129.9	*	1	2105	254
1	0430	55	13.	80.2	8130.0	*	1	1250	155	3.	79.1	8129.9	*	1	2110	255
1	0435	56	13.	80.2	8130.0	*	1	1255	156	3.	79.1	8129.9	*	1	2115	256
1	0440	57	13.	80.2	8130.0	*	1	1300	157	3.	79.1	8129.9	*	1	2120	257
1	0445	58	13.	80.2	8130.0	*	1	1305	158	3.	79.1	8129.9	*	1	2125	258
1	0450	59	13.	80.2	8130.0	*	1	1310	159	3.	79.1	8129.9	*	1	2130	259
1	0455	60	13.	80.1	8130.0	*	1	1315	160	3.	79.1	8129.9	*	1	2135	260
1	0500	61	12.	80.1	8130.0	*	1	1320	161	3.	79.1	8129.9	*	1	2140	261
1	0505	62	12.	80.1	8130.0	*	1	1325	162	3.	79.1	8129.9	*	1	2145	262
1	0510	63	12.	80.1	8130.0	*	1	1330	163	3.	79.0	8129.9	*	1	2150	263

1	0515	64	12.	80.0	8130.0	*	1	1335	164	3.	79.0	8129.9	*	1	2155	264
1	0520	65	11.	80.0	8130.0	*	1	1340	165	3.	79.0	8129.9	*	1	2200	265
1	0525	66	11.	80.0	8130.0	*	1	1345	166	2.	79.0	8129.9	*	1	2205	266
1	0530	67	11.	80.0	8130.0	*	1	1350	167	2.	79.0	8129.9	*	1	2210	267
1	0535	68	11.	80.0	8130.0	*	1	1355	168	2.	79.0	8129.9	*	1	2215	268
1	0540	69	10.	79.9	8130.0	*	1	1400	169	2.	79.0	8129.9	*	1	2220	269
1	0545	70	10.	79.9	8130.0	*	1	1405	170	2.	79.0	8129.9	*	1	2225	270
1	0550	71	10.	79.9	8130.0	*	1	1410	171	2.	79.0	8129.9	*	1	2230	271
1	0555	72	10.	79.9	8130.0	*	1	1415	172	2.	79.0	8129.9	*	1	2235	272
1	0600	73	9.	79.8	8130.0	*	1	1420	173	2.	79.0	8129.9	*	1	2240	273
1	0605	74	9.	79.8	8130.0	*	1	1425	174	2.	79.0	8129.9	*	1	2245	274
1	0610	75	9.	79.8	8130.0	*	1	1430	175	2.	79.0	8129.9	*	1	2250	275
1	0615	76	9.	79.8	8130.0	*	1	1435	176	2.	79.0	8129.9	*	1	2255	276
1	0620	77	9.	79.8	8130.0	*	1	1440	177	2.	79.0	8129.9	*	1	2300	277
1	0625	78	9.	79.8	8130.0	*	1	1445	178	2.	79.0	8129.9	*	1	2305	278
1	0630	79	9.	79.8	8130.0	*	1	1450	179	2.	79.0	8129.9	*	1	2310	279
1	0635	80	9.	79.7	8130.0	*	1	1455	180	2.	79.0	8129.9	*	1	2315	280
1	0640	81	8.	79.7	8130.0	*	1	1500	181	2.	79.0	8129.9	*	1	2320	281
1	0645	82	8.	79.7	8130.0	*	1	1505	182	2.	79.0	8129.9	*	1	2325	282
1	0650	83	8.	79.7	8130.0	*	1	1510	183	2.	79.0	8129.9	*	1	2330	283
1	0655	84	8.	79.7	8130.0	*	1	1515	184	2.	79.0	8129.9	*	1	2335	284
1	0700	85	8.	79.7	8130.0	*	1	1520	185	2.	79.0	8129.9	*	1	2340	285
1	0705	86	8.	79.7	8130.0	*	1	1525	186	2.	79.0	8129.9	*	1	2345	286
1	0710	87	8.	79.7	8130.0	*	1	1530	187	2.	79.0	8129.9	*	1	2350	287
1	0715	88	8.	79.7	8130.0	*	1	1535	188	2.	79.0	8129.9	*	1	2355	288
1	0720	89	8.	79.7	8130.0	*	1	1540	189	2.	79.0	8129.9	*	2	0000	289
1	0725	90	7.	79.6	8130.0	*	1	1545	190	2.	79.0	8129.9	*	2	0005	290
1	0730	91	7.	79.6	8130.0	*	1	1550	191	2.	79.0	8129.9	*	2	0010	291
1	0735	92	7.	79.6	8130.0	*	1	1555	192	2.	79.0	8129.9	*	2	0015	292
1	0740	93	7.	79.6	8130.0	*	1	1600	193	2.	79.0	8129.9	*	2	0020	293
1	0745	94	7.	79.6	8130.0	*	1	1605	194	2.	79.0	8129.9	*	2	0025	294
1	0750	95	7.	79.6	8130.0	*	1	1610	195	2.	78.9	8129.9	*	2	0030	295
1	0755	96	7.	79.6	8130.0	*	1	1615	196	2.	78.9	8129.9	*	2	0035	296
1	0800	97	7.	79.6	8130.0	*	1	1620	197	2.	78.9	8129.9	*	2	0040	297
1	0805	98	7.	79.6	8129.9	*	1	1625	198	2.	78.9	8129.9	*	2	0045	298
1	0810	99	7.	79.5	8129.9	*	1	1630	199	2.	78.9	8129.9	*	2	0050	299
1	0815	100	6.	79.5	8129.9	*	1	1635	200	2.	78.9	8129.9	*	2	0055	300
						*							*			

****

PEAK OUTFLOW IS 13. AT TIME 4.50 HOURS

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	13.	4.50		9.	3.	3.	3.
			(INCHES)	.247	.399	.399	.399

```
                    (AC-FT)        4.          7.          7.          7.

 PEAK STORAGE   TIME                        MAXIMUM AVERAGE STORAGE
                                   6-HR       24-HR       72-HR     24.92-HR
+  (AC-FT)      (HR)
      80.       4.50                80.         79.         79.         79.

  PEAK STAGE    TIME                        MAXIMUM AVERAGE STAGE
                                   6-HR       24-HR       72-HR     24.92-HR
+   (FEET)      (HR)
   8129.98      4.50             8129.96     8129.91     8129.92     8129.92

                    CUMULATIVE AREA =     .32 SQ MI

1
                                                  RUNOFF SUMMARY
                                              FLOW IN CUBIC FEET PER SECOND
                                            TIME IN HOURS,  AREA IN SQUARE MILES

                                   PEAK   TIME OF    AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     M
        OPERATION       STATION    FLOW    PEAK                                          AREA
+                                                    6-HOUR     24-HOUR     72-HOUR

        HYDROGRAPH AT
+                       INFLOW      34.    3.83         10.          3.          3.        .32

        ROUTED TO
+                         DAM       13.    4.50          9.          3.          3.        .32
+                                                                                                8
1                          SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     DAM
                       (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

     PLAN  1 ...............                  INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION          8129.90           8129.90          8132.10
                              STORAGE                78.               78.             133.
                              OUTFLOW                 0.                0.            1958.

                    RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIM
                      OF     RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAI
                     PMF      W.S.ELEV    OVER DAM    AC-FT       CFS       HOURS        HOURS       HO

                    1.00      8129.98        .00        80.        13.        .00         4.50
1                                                   HEC-1 INPUT

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....

 *** WARNING *** ZZ-CARD MISSING
```

```
              1
              2             ZZ
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *               JUN   1998              *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   20DEC00  TIME  14:57:32   *
 *                                       *
 *****************************************
```

```
*************
*
*    U.S. ARM
*    HYDROLOG
*          60
*       DAVIS
*           (
*
*************
```

```
*** HEC-1 ERROR 1 *** INVALID CARD IDENTIFICATION CODE OR CARD OUT OF SEQUENCE
     CARD NO.    1

     IT          HYDROGRAPH TIME DATA
                       NMIN            5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1     0  STARTING DATE
                      ITIME         0000  STARTING TIME
                         NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2     0  ENDING DATE
                     NDTIME         0055  ENDING TIME
                     ICENT            19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

               SUBBASIN RUNOFF DATA

   0 BA          SUBBASIN CHARACTERISTICS
                      TAREA          .00  SUBBASIN AREA

                 PRECIPITATION DATA

   0 PH                                  DEPTHS FOR   1-PERCENT HYPOTHETICAL STORM
```

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	1
.42	.82	1.44	1.53	1.61	1.80	.00	.00	.00	.00	.00	

STORM AREA = .00

0 UI INPUT UNITGRAPH, 0 ORDINATES, VOLUME = .00

***

****

HYDROGRAPH AT STATION DAM

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS
1		0000	1	.00	.00	.00	0.	*	1		1230	151	.00	.00
1		0005	2	.27	.00	.27	0.	*	1		1235	152	.00	.00
1		0010	3	.27	.00	.27	0.	*	1		1240	153	.00	.00
1		0015	4	.00	.00	.00	0.	*	1		1245	154	.00	.00
1		0020	5	.00	.00	.00	0.	*	1		1250	155	.00	.00
1		0025	6	.00	.00	.00	0.	*	1		1255	156	.00	.00
1		0030	7	.00	.00	.00	0.	*	1		1300	157	.00	.00
1		0035	8	.00	.00	.00	0.	*	1		1305	158	.00	.00
1		0040	9	.00	.00	.00	0.	*	1		1310	159	.00	.00
1		0045	10	.00	.00	.00	0.	*	1		1315	160	.00	.00
1		0050	11	.00	.00	.00	0.	*	1		1320	161	.00	.00
1		0055	12	.00	.00	.00	0.	*	1		1325	162	.00	.00
1		0100	13	.00	.00	.00	0.	*	1		1330	163	.00	.00
1		0105	14	.00	.00	.00	0.	*	1		1335	164	.00	.00
1		0110	15	.00	.00	.00	0.	*	1		1340	165	.00	.00
1		0115	16	.00	.00	.00	0.	*	1		1345	166	.00	.00
1		0120	17	.00	.00	.00	0.	*	1		1350	167	.00	.00
1		0125	18	.00	.00	.00	0.	*	1		1355	168	.00	.00
1		0130	19	.00	.00	.00	0.	*	1		1400	169	.00	.00
1		0135	20	.00	.00	.00	0.	*	1		1405	170	.00	.00
1		0140	21	.00	.00	.00	0.	*	1		1410	171	.00	.00
1		0145	22	.00	.00	.00	0.	*	1		1415	172	.00	.00
1		0150	23	.00	.00	.00	0.	*	1		1420	173	.00	.00
1		0155	24	.00	.00	.00	0.	*	1		1425	174	.00	.00
1		0200	25	.00	.00	.00	0.	*	1		1430	175	.00	.00
1		0205	26	.00	.00	.00	0.	*	1		1435	176	.00	.00
1		0210	27	.00	.00	.00	0.	*	1		1440	177	.00	.00
1		0215	28	.00	.00	.00	0.	*	1		1445	178	.00	.00
1		0220	29	.00	.00	.00	0.	*	1		1450	179	.00	.00
1		0225	30	.00	.00	.00	0.	*	1		1455	180	.00	.00

1	0230	31	.00	.00	.00	0.	*
1	0235	32	.00	.00	.00	0.	*
1	0240	33	.00	.00	.00	0.	*
1	0245	34	.00	.00	.00	0.	*
1	0250	35	.00	.00	.00	0.	*
1	0255	36	.00	.00	.00	0.	*
1	0300	37	.00	.00	.00	0.	*
1	0305	38	.00	.00	.00	0.	*
1	0310	39	.00	.00	.00	0.	*
1	0315	40	.00	.00	.00	0.	*
1	0320	41	.00	.00	.00	0.	*
1	0325	42	.00	.00	.00	0.	*
1	0330	43	.00	.00	.00	0.	*
1	0335	44	.00	.00	.00	0.	*
1	0340	45	.00	.00	.00	0.	*
1	0345	46	.00	.00	.00	0.	*
1	0350	47	.00	.00	.00	0.	*
1	0355	48	.00	.00	.00	0.	*
1	0400	49	.00	.00	.00	0.	*
1	0405	50	.00	.00	.00	0.	*
1	0410	51	.00	.00	.00	0.	*
1	0415	52	.00	.00	.00	0.	*
1	0420	53	.00	.00	.00	0.	*
1	0425	54	.00	.00	.00	0.	*
1	0430	55	.00	.00	.00	0.	*
1	0435	56	.00	.00	.00	0.	*
1	0440	57	.00	.00	.00	0.	*
1	0445	58	.00	.00	.00	0.	*
1	0450	59	.00	.00	.00	0.	*
1	0455	60	.00	.00	.00	0.	*
1	0500	61	.00	.00	.00	0.	*
1	0505	62	.00	.00	.00	0.	*
1	0510	63	.00	.00	.00	0.	*
1	0515	64	.00	.00	.00	0.	*
1	0520	65	.00	.00	.00	0.	*
1	0525	66	.00	.00	.00	0.	*
1	0530	67	.00	.00	.00	0.	*
1	0535	68	.00	.00	.00	0.	*
1	0540	69	.00	.00	.00	0.	*
1	0545	70	.00	.00	.00	0.	*
1	0550	71	.00	.00	.00	0.	*
1	0555	72	.00	.00	.00	0.	*
1	0600	73	.00	.00	.00	0.	*
1	0605	74	.00	.00	.00	0.	*
1	0610	75	.00	.00	.00	0.	*
1	0615	76	.00	.00	.00	0.	*
1	0620	77	.00	.00	.00	0.	*
1	0625	78	.00	.00	.00	0.	*
1	0630	79	.00	.00	.00	0.	*

1	1500	181	.00	.00
1	1505	182	.00	.00
1	1510	183	.00	.00
1	1515	184	.00	.00
1	1520	185	.00	.00
1	1525	186	.00	.00
1	1530	187	.00	.00
1	1535	188	.00	.00
1	1540	189	.00	.00
1	1545	190	.00	.00
1	1550	191	.00	.00
1	1555	192	.00	.00
1	1600	193	.00	.00
1	1605	194	.00	.00
1	1610	195	.00	.00
1	1615	196	.00	.00
1	1620	197	.00	.00
1	1625	198	.00	.00
1	1630	199	.00	.00
1	1635	200	.00	.00
1	1640	201	.00	.00
1	1645	202	.00	.00
1	1650	203	.00	.00
1	1655	204	.00	.00
1	1700	205	.00	.00
1	1705	206	.00	.00
1	1710	207	.00	.00
1	1715	208	.00	.00
1	1720	209	.00	.00
1	1725	210	.00	.00
1	1730	211	.00	.00
1	1735	212	.00	.00
1	1740	213	.00	.00
1	1745	214	.00	.00
1	1750	215	.00	.00
1	1755	216	.00	.00
1	1800	217	.00	.00
1	1805	218	.00	.00
1	1810	219	.00	.00
1	1815	220	.00	.00
1	1820	221	.00	.00
1	1825	222	.00	.00
1	1830	223	.00	.00
1	1835	224	.00	.00
1	1840	225	.00	.00
1	1845	226	.00	.00
1	1850	227	.00	.00
1	1855	228	.00	.00
1	1900	229	.00	.00

1	0635	80	.00	.00	.00	0.	*
1	0640	81	.00	.00	.00	0.	*
1	0645	82	.00	.00	.00	0.	*
1	0650	83	.00	.00	.00	0.	*
1	0655	84	.00	.00	.00	0.	*
1	0700	85	.00	.00	.00	0.	*
1	0705	86	.00	.00	.00	0.	*
1	0710	87	.00	.00	.00	0.	*
1	0715	88	.00	.00	.00	0.	*
1	0720	89	.00	.00	.00	0.	*
1	0725	90	.00	.00	.00	0.	*
1	0730	91	.00	.00	.00	0.	*
1	0735	92	.00	.00	.00	0.	*
1	0740	93	.00	.00	.00	0.	*
1	0745	94	.00	.00	.00	0.	*
1	0750	95	.00	.00	.00	0.	*
1	0755	96	.00	.00	.00	0.	*
1	0800	97	.00	.00	.00	0.	*
1	0805	98	.00	.00	.00	0.	*
1	0810	99	.00	.00	.00	0.	*
1	0815	100	.00	.00	.00	0.	*
1	0820	101	.00	.00	.00	0.	*
1	0825	102	.00	.00	.00	0.	*
1	0830	103	.00	.00	.00	0.	*
1	0835	104	.00	.00	.00	0.	*
1	0840	105	.00	.00	.00	0.	*
1	0845	106	.00	.00	.00	0.	*
1	0850	107	.00	.00	.00	0.	*
1	0855	108	.00	.00	.00	0.	*
1	0900	109	.00	.00	.00	0.	*
1	0905	110	.00	.00	.00	0.	*
1	0910	111	.00	.00	.00	0.	*
1	0915	112	.00	.00	.00	0.	*
1	0920	113	.00	.00	.00	0.	*
1	0925	114	.00	.00	.00	0.	*
1	0930	115	.00	.00	.00	0.	*
1	0935	116	.00	.00	.00	0.	*
1	0940	117	.00	.00	.00	0.	*
1	0945	118	.00	.00	.00	0.	*
1	0950	119	.00	.00	.00	0.	*
1	0955	120	.00	.00	.00	0.	*
1	1000	121	.00	.00	.00	0.	*
1	1005	122	.00	.00	.00	0.	*
1	1010	123	.00	.00	.00	0.	*
1	1015	124	.00	.00	.00	0.	*
1	1020	125	.00	.00	.00	0.	*
1	1025	126	.00	.00	.00	0.	*
1	1030	127	.00	.00	.00	0.	*
1	1035	128	.00	.00	.00	0.	*

1	1905	230	.00	.00
1	1910	231	.00	.00
1	1915	232	.00	.00
1	1920	233	.00	.00
1	1925	234	.00	.00
1	1930	235	.00	.00
1	1935	236	.00	.00
1	1940	237	.00	.00
1	1945	238	.00	.00
1	1950	239	.00	.00
1	1955	240	.00	.00
1	2000	241	.00	.00
1	2005	242	.00	.00
1	2010	243	.00	.00
1	2015	244	.00	.00
1	2020	245	.00	.00
1	2025	246	.00	.00
1	2030	247	.00	.00
1	2035	248	.00	.00
1	2040	249	.00	.00
1	2045	250	.00	.00
1	2050	251	.00	.00
1	2055	252	.00	.00
1	2100	253	.00	.00
1	2105	254	.00	.00
1	2110	255	.00	.00
1	2115	256	.00	.00
1	2120	257	.00	.00
1	2125	258	.00	.00
1	2130	259	.00	.00
1	2135	260	.00	.00
1	2140	261	.00	.00
1	2145	262	.00	.00
1	2150	263	.00	.00
1	2155	264	.00	.00
1	2200	265	.00	.00
1	2205	266	.00	.00
1	2210	267	.00	.00
1	2215	268	.00	.00
1	2220	269	.00	.00
1	2225	270	.00	.00
1	2230	271	.00	.00
1	2235	272	.00	.00
1	2240	273	.00	.00
1	2245	274	.00	.00
1	2250	275	.00	.00
1	2255	276	.00	.00
1	2300	277	.00	.00
1	2305	278	.00	.00

1	1040	129	.00	.00	.00	0.	*	1	2310	279	.00	.00
1	1045	130	.00	.00	.00	0.	*	1	2315	280	.00	.00
1	1050	131	.00	.00	.00	0.	*	1	2320	281	.00	.00
1	1055	132	.00	.00	.00	0.	*	1	2325	282	.00	.00
1	1100	133	.00	.00	.00	0.	*	1	2330	283	.00	.00
1	1105	134	.00	.00	.00	0.	*	1	2335	284	.00	.00
1	1110	135	.00	.00	.00	0.	*	1	2340	285	.00	.00
1	1115	136	.00	.00	.00	0.	*	1	2345	286	.00	.00
1	1120	137	.00	.00	.00	0.	*	1	2350	287	.00	.00
1	1125	138	.00	.00	.00	0.	*	1	2355	288	.00	.00
1	1130	139	.00	.00	.00	0.	*	2	0000	289	.00	.00
1	1135	140	.00	.00	.00	0.	*	2	0005	290	.00	.00
1	1140	141	.00	.00	.00	0.	*	2	0010	291	.00	.00
1	1145	142	.00	.00	.00	0.	*	2	0015	292	.00	.00
1	1150	143	.00	.00	.00	0.	*	2	0020	293	.00	.00
1	1155	144	.00	.00	.00	0.	*	2	0025	294	.00	.00
1	1200	145	.00	.00	.00	0.	*	2	0030	295	.00	.00
1	1205	146	.00	.00	.00	0.	*	2	0035	296	.00	.00
1	1210	147	.00	.00	.00	0.	*	2	0040	297	.00	.00
1	1215	148	.00	.00	.00	0.	*	2	0045	298	.00	.00
1	1220	149	.00	.00	.00	0.	*	2	0050	299	.00	.00
1	1225	150	.00	.00	.00	0.	*	2	0055	300	.00	.00
							*					

****

TOTAL RAINFALL = .55, TOTAL LOSS = .00, TOTAL EXCESS = .55

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 0.	.00		0.	0.	0.	0.
		(INCHES)	.000	.000	.000	.000
		(AC-FT)	0.	0.	0.	0.

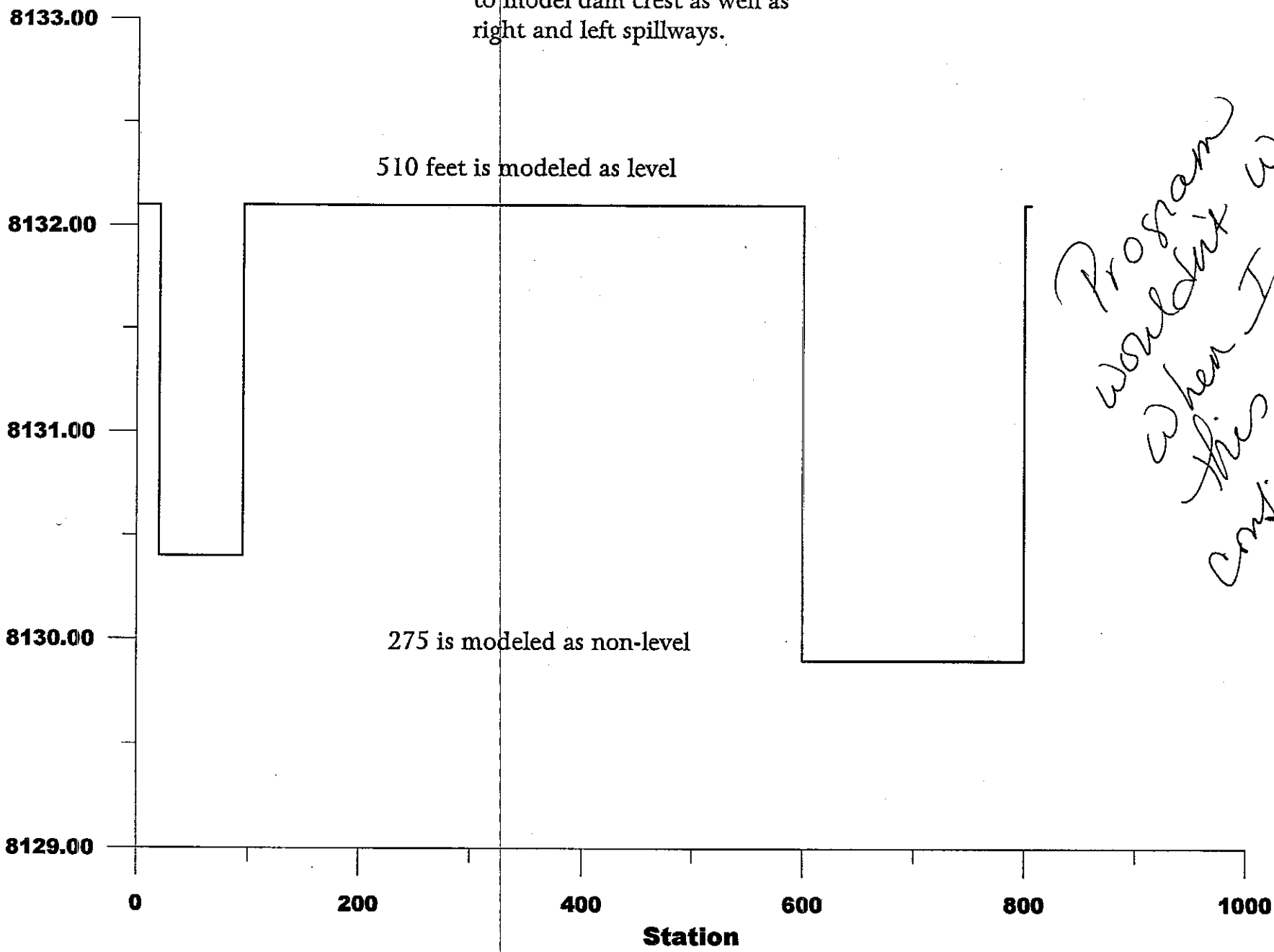
CUMULATIVE AREA = .32 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	M
+	HYDROGRAPH AT	DAM	0.	.00	0.	0.	0.	.32	

Year 2000 HEC 1 Analysis
Non-level top of dam option used
to model dam crest as well as
right and left spillways.



Program wouldn't work when I tried this configuration.

```
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *              JUN   1998              *
 *           VERSION 4.1                *
 *                                      *
 *  RUN DATE   21DEC00  TIME  13:38:38  *
 *                                      *
 ****************************************
```

```
*************
*
*    U.S. ARM
*    HYDROLOG
*          60
*       DAVIS
*           (
*
*************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, A

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-ST
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE F
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE F
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1

HEC-1 INPUT

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......

   1          ID  Case No. 1 Reservoir Analysis - 50-year, 6-hour duration flood
   2          ID   Res full to spillway crest, no low-level outlet works
   3          IT       5       0       0     300
   4          IO       4

   5          KK  INFLOW
   6          BA    0.32
   7          BF     -.5    -.25     1.2
   8          PH       2            .36     .71    1.25    1.35    1.45    1.60
   9          LS              72
  10          UD     .60
```

```
          11          KK    DAM
          12          KO       1
          13          RS       1    ELEV  8129.9
          14          SA       0    21.6    28.3
          15          SE    8119  8129.9  8132.1
          16          SS  8129.9     200     3.0     1.5
          17          ST  8132.1     585     2.8     1.5
          18          SW       0      20      20      95      95     585
          19          SE  8132.1  8132.1  8130.4  8130.4  8132.1  8132.1
          20          ZZ
1*****************************************                                                  *************
 *                                       *                                                  *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                  *    U.S. ARM
 *              JUN   1998               *                                                  *    HYDROLOG
 *           VERSION 4.1                 *                                                  *          60
 *                                       *                                                  *       DAVIS
 *  RUN DATE   21DEC00  TIME  13:38:38   *                                                  *           (
 *                                       *                                                  *
 *****************************************                                                  *************


                        Case No. 1 Reservoir Analysis - 50-year, 6-hour duration flood
                         Res full to spillway crest, no low-level outlet works

   4 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN           5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2    0  ENDING DATE
                     NDTIME        0055  ENDING TIME
                     ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
```

```
          FLOW                    CUBIC FEET PER SECOND
          STORAGE VOLUME          ACRE-FEET
          SURFACE AREA            ACRES
          TEMPERATURE             DEGREES FAHRENHEIT


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *

          **************
          *            *
  5 KK    *    INFLOW  *
          *            *
          **************

          SUBBASIN RUNOFF DATA

  6 BA      SUBBASIN CHARACTERISTICS
                TAREA          .32  SUBBASIN AREA

  7 BF      BASE FLOW CHARACTERISTICS
                STRTQ          .16  INITIAL FLOW
                QRCSN         -.25  BEGIN BASE FLOW RECESSION
                RTIOR      1.20000  RECESSION CONSTANT

            PRECIPITATION DATA

  8 PH                          DEPTHS FOR   2-PERCENT HYPOTHETICAL STORM
            ..... HYDRO-35 ......  ............... TP-40 ...............  ........... TP-49 ......
            5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  1
              .36     .71    1.25    1.35    1.45    1.60     .00     .00     .00     .00     .00

                                                STORM AREA =     .32

  9 LS      SCS LOSS RATE
                STRTL          .78  INITIAL ABSTRACTION
               CRVNBR        72.00  CURVE NUMBER
                RTIMP          .00  PERCENT IMPERVIOUS AREA

 10 UD      SCS DIMENSIONLESS UNITGRAPH
                 TLAG          .60  LAG

                                                        ***

                                                  UNIT HYDROGRAPH
                                            38 END-OF-PERIOD ORDINATES
           12.       37.       72.      122.      178.      219.      239.      240.      229.
          181.      147.      114.       91.       74.       61.       49.       40.       32.
```

```
                21.       17.       14.       11.        9.        7.        6.        5.        4.
                 3.        2.        2.        1.        1.        1.        0.        0.

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *

            **************
            *            *
  11 KK     *      DAM   *
            *            *
            **************

  12 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           1  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

  13 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
                        ITYP        ELEV  TYPE OF INITIAL CONDITION
                      RSVRIC     8129.90  INITIAL CONDITION
                           X         .00 WORKING R AND D COEFFICIENT

  14 SA               AREA          .0      21.6      28.3

  15 SE          ELEVATION     8119.00   8129.90   8132.10

  16 SS          SPILLWAY
                        CREL     8129.90  SPILLWAY CREST ELEVATION
                       SPWID      200.00  SPILLWAY WIDTH
                        COQW        3.00  WEIR COEFFICIENT
                        EXPW        1.50  EXPONENT OF HEAD

  17 ST          TOP OF DAM
                       TOPEL     8132.10  ELEVATION AT TOP OF DAM
                      DAMWID      585.00  DAM WIDTH
                        COQD        2.80  WEIR COEFFICIENT
                        EXPD        1.50  EXPONENT OF HEAD

     SW          DAM WIDTH          .00     20.00     20.00     95.00     95.00    585.00
     SE          ELEVATION     8132.10   8132.10   8130.40   8130.40   8132.10   8132.10

                                                                  ***

                                                  COMPUTED STORAGE-ELEVATION DATA
```

STORAGE	.00	78.48	133.21
ELEVATION	8119.00	8129.90	8132.10

COMPUTED OUTFLOW-ELEVATION DATA

(EXCLUDING FLOW OVER DAM)

OUTFLOW	.00	.00	.34	2.71	9.05	21.56	42.03	72.60	1
ELEVATION	8119.00	8129.90	8129.91	8129.93	8129.96	8130.01	8130.07	8130.14	81
OUTFLOW	244.60	335.85	446.97	580.33	737.49	921.39	1133.09	1375.09	16
ELEVATION	8130.45	8130.58	8130.72	8130.88	8131.05	8131.23	8131.43	8131.64	81

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

(INCLUDING FLOW OVER DAM)

STORAGE	.00	78.48	79.07	79.80	80.85	82.19	83.85	85.82	
OUTFLOW	.00	.00	2.71	9.05	21.56	42.03	72.60	115.05	1
ELEVATION	8119.00	8129.90	8129.93	8129.96	8130.01	8130.07	8130.14	8130.23	81
STORAGE	93.81	97.21	100.99	105.18	109.82	114.91	120.48	126.57	1
OUTFLOW	335.85	446.97	580.33	737.49	921.39	1133.09	1375.09	1649.43	19
ELEVATION	8130.58	8130.72	8130.88	8131.05	8131.23	8131.43	8131.64	8131.86	81

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HYDROGRAPH AT STATION DAM

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD
1		0000	1	0.	78.5	8129.9	*	1		0820	101	4.	79.3	8129.9	*	1		1640	201
1		0005	2	0.	78.5	8129.9	*	1		0825	102	4.	79.2	8129.9	*	1		1645	202
1		0010	3	0.	78.5	8129.9	*	1		0830	103	4.	79.2	8129.9	*	1		1650	203
1		0015	4	0.	78.5	8129.9	*	1		0835	104	4.	79.2	8129.9	*	1		1655	204
1		0020	5	0.	78.5	8129.9	*	1		0840	105	4.	79.2	8129.9	*	1		1700	205
1		0025	6	0.	78.5	8129.9	*	1		0845	106	4.	79.2	8129.9	*	1		1705	206
1		0030	7	0.	78.5	8129.9	*	1		0850	107	4.	79.2	8129.9	*	1		1710	207
1		0035	8	0.	78.5	8129.9	*	1		0855	108	4.	79.2	8129.9	*	1		1715	208
1		0040	9	0.	78.5	8129.9	*	1		0900	109	3.	79.2	8129.9	*	1		1720	209
1		0045	10	0.	78.5	8129.9	*	1		0905	110	3.	79.2	8129.9	*	1		1725	210
1		0050	11	0.	78.5	8129.9	*	1		0910	111	3.	79.2	8129.9	*	1		1730	211
1		0055	12	0.	78.5	8129.9	*	1		0915	112	3.	79.2	8129.9	*	1		1735	212
1		0100	13	0.	78.5	8129.9	*	1		0920	113	3.	79.2	8129.9	*	1		1740	213
1		0105	14	0.	78.5	8129.9	*	1		0925	114	3.	79.2	8129.9	*	1		1745	214

1	0110	15	0.	78.5	8129.9	*	1	0930	115	3.	79.1	8129.9	*	1	1750	215
1	0115	16	0.	78.5	8129.9	*	1	0935	116	3.	79.1	8129.9	*	1	1755	216
1	0120	17	0.	78.5	8129.9	*	1	0940	117	3.	79.1	8129.9	*	1	1800	217
1	0125	18	0.	78.5	8129.9	*	1	0945	118	3.	79.1	8129.9	*	1	1805	218
1	0130	19	0.	78.5	8129.9	*	1	0950	119	3.	79.1	8129.9	*	1	1810	219
1	0135	20	0.	78.5	8129.9	*	1	0955	120	3.	79.1	8129.9	*	1	1815	220
1	0140	21	0.	78.5	8129.9	*	1	1000	121	3.	79.1	8129.9	*	1	1820	221
1	0145	22	0.	78.5	8129.9	*	1	1005	122	3.	79.1	8129.9	*	1	1825	222
1	0150	23	0.	78.5	8129.9	*	1	1010	123	3.	79.1	8129.9	*	1	1830	223
1	0155	24	0.	78.5	8129.9	*	1	1015	124	3.	79.1	8129.9	*	1	1835	224
1	0200	25	0.	78.5	8129.9	*	1	1020	125	3.	79.1	8129.9	*	1	1840	225
1	0205	26	0.	78.5	8129.9	*	1	1025	126	3.	79.1	8129.9	*	1	1845	226
1	0210	27	0.	78.5	8129.9	*	1	1030	127	3.	79.1	8129.9	*	1	1850	227
1	0215	28	0.	78.5	8129.9	*	1	1035	128	3.	79.1	8129.9	*	1	1855	228
1	0220	29	0.	78.5	8129.9	*	1	1040	129	3.	79.1	8129.9	*	1	1900	229
1	0225	30	0.	78.5	8129.9	*	1	1045	130	3.	79.1	8129.9	*	1	1905	230
1	0230	31	0.	78.5	8129.9	*	1	1050	131	3.	79.1	8129.9	*	1	1910	231
1	0235	32	0.	78.5	8129.9	*	1	1055	132	3.	79.1	8129.9	*	1	1915	232
1	0240	33	0.	78.5	8129.9	*	1	1100	133	3.	79.1	8129.9	*	1	1920	233
1	0245	34	0.	78.5	8129.9	*	1	1105	134	3.	79.1	8129.9	*	1	1925	234
1	0250	35	0.	78.5	8129.9	*	1	1110	135	3.	79.1	8129.9	*	1	1930	235
1	0255	36	0.	78.5	8129.9	*	1	1115	136	3.	79.0	8129.9	*	1	1935	236
1	0300	37	0.	78.5	8129.9	*	1	1120	137	3.	79.0	8129.9	*	1	1940	237
1	0305	38	0.	78.5	8129.9	*	1	1125	138	3.	79.0	8129.9	*	1	1945	238
1	0310	39	0.	78.5	8129.9	*	1	1130	139	2.	79.0	8129.9	*	1	1950	239
1	0315	40	0.	78.5	8129.9	*	1	1135	140	2.	79.0	8129.9	*	1	1955	240
1	0320	41	0.	78.5	8129.9	*	1	1140	141	2.	79.0	8129.9	*	1	2000	241
1	0325	42	0.	78.6	8129.9	*	1	1145	142	2.	79.0	8129.9	*	1	2005	242
1	0330	43	0.	78.6	8129.9	*	1	1150	143	2.	79.0	8129.9	*	1	2010	243
1	0335	44	1.	78.7	8129.9	*	1	1155	144	2.	79.0	8129.9	*	1	2015	244
1	0340	45	1.	78.8	8129.9	*	1	1200	145	2.	79.0	8129.9	*	1	2020	245
1	0345	46	2.	78.9	8129.9	*	1	1205	146	2.	79.0	8129.9	*	1	2025	246
1	0350	47	3.	79.0	8129.9	*	1	1210	147	2.	79.0	8129.9	*	1	2030	247
1	0355	48	3.	79.2	8129.9	*	1	1215	148	2.	79.0	8129.9	*	1	2035	248
1	0400	49	4.	79.3	8129.9	*	1	1220	149	2.	79.0	8129.9	*	1	2040	249
1	0405	50	5.	79.4	8129.9	*	1	1225	150	2.	79.0	8129.9	*	1	2045	250
1	0410	51	6.	79.5	8129.9	*	1	1230	151	2.	79.0	8129.9	*	1	2050	251
1	0415	52	6.	79.5	8129.9	*	1	1235	152	2.	79.0	8129.9	*	1	2055	252
1	0420	53	7.	79.6	8130.0	*	1	1240	153	2.	79.0	8129.9	*	1	2100	253
1	0425	54	7.	79.6	8130.0	*	1	1245	154	2.	79.0	8129.9	*	1	2105	254
1	0430	55	7.	79.6	8130.0	*	1	1250	155	2.	79.0	8129.9	*	1	2110	255
1	0435	56	8.	79.7	8130.0	*	1	1255	156	2.	79.0	8129.9	*	1	2115	256
1	0440	57	8.	79.7	8130.0	*	1	1300	157	2.	79.0	8129.9	*	1	2120	257
1	0445	58	8.	79.7	8130.0	*	1	1305	158	2.	79.0	8129.9	*	1	2125	258
1	0450	59	8.	79.7	8130.0	*	1	1310	159	2.	79.0	8129.9	*	1	2130	259
1	0455	60	8.	79.7	8130.0	*	1	1315	160	2.	79.0	8129.9	*	1	2135	260
1	0500	61	8.	79.7	8130.0	*	1	1320	161	2.	79.0	8129.9	*	1	2140	261
1	0505	62	8.	79.7	8130.0	*	1	1325	162	2.	79.0	8129.9	*	1	2145	262
1	0510	63	8.	79.7	8130.0	*	1	1330	163	2.	79.0	8129.9	*	1	2150	263

1	0515	64	7.	79.6	8130.0	*	1	1335	164	2.	79.0	8129.9	*	1	2155	264
1	0520	65	7.	79.6	8130.0	*	1	1340	165	2.	79.0	8129.9	*	1	2200	265
1	0525	66	7.	79.6	8130.0	*	1	1345	166	2.	79.0	8129.9	*	1	2205	266
1	0530	67	7.	79.6	8130.0	*	1	1350	167	2.	79.0	8129.9	*	1	2210	267
1	0535	68	7.	79.6	8130.0	*	1	1355	168	2.	78.9	8129.9	*	1	2215	268
1	0540	69	7.	79.6	8130.0	*	1	1400	169	2.	78.9	8129.9	*	1	2220	269
1	0545	70	7.	79.6	8130.0	*	1	1405	170	2.	78.9	8129.9	*	1	2225	270
1	0550	71	7.	79.6	8130.0	*	1	1410	171	2.	78.9	8129.9	*	1	2230	271
1	0555	72	7.	79.6	8129.9	*	1	1415	172	2.	78.9	8129.9	*	1	2235	272
1	0600	73	7.	79.5	8129.9	*	1	1420	173	2.	78.9	8129.9	*	1	2240	273
1	0605	74	6.	79.5	8129.9	*	1	1425	174	2.	78.9	8129.9	*	1	2245	274
1	0610	75	6.	79.5	8129.9	*	1	1430	175	2.	78.9	8129.9	*	1	2250	275
1	0615	76	6.	79.5	8129.9	*	1	1435	176	2.	78.9	8129.9	*	1	2255	276
1	0620	77	6.	79.5	8129.9	*	1	1440	177	2.	78.9	8129.9	*	1	2300	277
1	0625	78	6.	79.5	8129.9	*	1	1445	178	2.	78.9	8129.9	*	1	2305	278
1	0630	79	6.	79.5	8129.9	*	1	1450	179	2.	78.9	8129.9	*	1	2310	279
1	0635	80	6.	79.5	8129.9	*	1	1455	180	2.	78.9	8129.9	*	1	2315	280
1	0640	81	6.	79.5	8129.9	*	1	1500	181	2.	78.9	8129.9	*	1	2320	281
1	0645	82	6.	79.5	8129.9	*	1	1505	182	2.	78.9	8129.9	*	1	2325	282
1	0650	83	6.	79.4	8129.9	*	1	1510	183	2.	78.9	8129.9	*	1	2330	283
1	0655	84	6.	79.4	8129.9	*	1	1515	184	2.	78.9	8129.9	*	1	2335	284
1	0700	85	5.	79.4	8129.9	*	1	1520	185	2.	78.9	8129.9	*	1	2340	285
1	0705	86	5.	79.4	8129.9	*	1	1525	186	2.	78.9	8129.9	*	1	2345	286
1	0710	87	5.	79.4	8129.9	*	1	1530	187	2.	78.9	8129.9	*	1	2350	287
1	0715	88	5.	79.4	8129.9	*	1	1535	188	2.	78.9	8129.9	*	1	2355	288
1	0720	89	5.	79.4	8129.9	*	1	1540	189	2.	78.9	8129.9	*	2	0000	289
1	0725	90	5.	79.4	8129.9	*	1	1545	190	2.	78.9	8129.9	*	2	0005	290
1	0730	91	5.	79.4	8129.9	*	1	1550	191	2.	78.9	8129.9	*	2	0010	291
1	0735	92	5.	79.3	8129.9	*	1	1555	192	2.	78.9	8129.9	*	2	0015	292
1	0740	93	5.	79.3	8129.9	*	1	1600	193	2.	78.9	8129.9	*	2	0020	293
1	0745	94	5.	79.3	8129.9	*	1	1605	194	2.	78.9	8129.9	*	2	0025	294
1	0750	95	5.	79.3	8129.9	*	1	1610	195	2.	78.9	8129.9	*	2	0030	295
1	0755	96	4.	79.3	8129.9	*	1	1615	196	2.	78.9	8129.9	*	2	0035	296
1	0800	97	4.	79.3	8129.9	*	1	1620	197	2.	78.9	8129.9	*	2	0040	297
1	0805	98	4.	79.3	8129.9	*	1	1625	198	2.	78.9	8129.9	*	2	0045	298
1	0810	99	4.	79.3	8129.9	*	1	1630	199	2.	78.9	8129.9	*	2	0050	299
1	0815	100	4.	79.3	8129.9	*	1	1635	200	2.	78.9	8129.9	*	2	0055	300
						*							*			

****

PEAK OUTFLOW IS 8. AT TIME 4.67 HOURS

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	8.	4.67		5.	2.	2.	2.
			(INCHES)	.156	.275	.275	.275

```
                          (AC-FT)        3.          5.          5.          5.

 PEAK STORAGE    TIME                          MAXIMUM AVERAGE STORAGE
                                        6-HR       24-HR       72-HR     24.92-HR
+  (AC-FT)       (HR)
       80.       4.67                    79.         79.         79.         79.

  PEAK STAGE     TIME                          MAXIMUM AVERAGE STAGE
                                        6-HR       24-HR       72-HR     24.92-HR
+   (FEET)       (HR)
   8129.96       4.67                 8129.96     8129.91     8129.92     8129.92

                          CUMULATIVE AREA =      .32 SQ MI

1
                                                          RUNOFF SUMMARY
                                                     FLOW IN CUBIC FEET PER SECOND
                                                   TIME IN HOURS,  AREA IN SQUARE MILES

                                      PEAK    TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN      M
         OPERATION        STATION     FLOW     PEAK                                           AREA
+                                                          6-HOUR     24-HOUR     72-HOUR

         HYDROGRAPH AT
+                          INFLOW       21.     3.83          6.          2.          2.        .32

         ROUTED TO
+                            DAM         8.     4.67          5.          2.          2.        .32
+                                                                                                    8
1                                  SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     DAM
                                (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

     PLAN  1 ...............                  INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                                ELEVATION        8129.90           8129.90          8132.10
                                STORAGE              78.               78.              133.
                                OUTFLOW               0.                0.             1958.

                      RATIO     MAXIMUM      MAXIMUM     MAXIMUM     MAXIMUM     DURATION     TIME OF     TIM
                        OF     RESERVOIR     DEPTH      STORAGE     OUTFLOW     OVER TOP    MAX OUTFLOW   FAI
                       PMF     W.S.ELEV     OVER DAM     AC-FT        CFS        HOURS        HOURS       HO

                      1.00     8129.96        .00         80.          8.         .00          4.67
1                                                       HEC-1 INPUT

         LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......

 *** WARNING *** ZZ-CARD MISSING
```

```
              1
              2            ZZ
1*****************************************                                                  *************
 *                                       *                                                  *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                  *    U.S. ARM
 *              JUN   1998               *                                                  *    HYDROLOG
 *           VERSION 4.1                 *                                                  *          60
 *                                       *                                                  *       DAVIS
 *  RUN DATE   21DEC00  TIME  13:38:38   *                                                  *           (
 *                                       *                                                  *
 *****************************************                                                  *************


*** HEC-1 ERROR 1 *** INVALID CARD IDENTIFICATION CODE OR CARD OUT OF SEQUENCE
     CARD NO.    1

     IT          HYDROGRAPH TIME DATA
                       NMIN            5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1     0  STARTING DATE
                      ITIME         0000  STARTING TIME
                         NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2     0  ENDING DATE
                     NDTIME         0055  ENDING TIME
                     ICENT            19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                       TOTAL TIME BASE    24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

               SUBBASIN RUNOFF DATA

   0 BA          SUBBASIN CHARACTERISTICS
                      TAREA          .00  SUBBASIN AREA

                 PRECIPITATION DATA

   0 PH                                  DEPTHS FOR   2-PERCENT HYPOTHETICAL STORM
```

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	1
.36	.71	1.25	1.35	1.45	1.60	.00	.00	.00	.00	.00	

STORM AREA = .00

0 UI INPUT UNITGRAPH, 0 ORDINATES, VOLUME = .00

***

****

HYDROGRAPH AT STATION DAM

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS
1		0000	1	.00	.00	.00	0.	*	1		1230	151	.00	.00
1		0005	2	.24	.00	.24	0.	*	1		1235	152	.00	.00
1		0010	3	.24	.00	.24	0.	*	1		1240	153	.00	.00
1		0015	4	.00	.00	.00	0.	*	1		1245	154	.00	.00
1		0020	5	.00	.00	.00	0.	*	1		1250	155	.00	.00
1		0025	6	.00	.00	.00	0.	*	1		1255	156	.00	.00
1		0030	7	.00	.00	.00	0.	*	1		1300	157	.00	.00
1		0035	8	.00	.00	.00	0.	*	1		1305	158	.00	.00
1		0040	9	.00	.00	.00	0.	*	1		1310	159	.00	.00
1		0045	10	.00	.00	.00	0.	*	1		1315	160	.00	.00
1		0050	11	.00	.00	.00	0.	*	1		1320	161	.00	.00
1		0055	12	.00	.00	.00	0.	*	1		1325	162	.00	.00
1		0100	13	.00	.00	.00	0.	*	1		1330	163	.00	.00
1		0105	14	.00	.00	.00	0.	*	1		1335	164	.00	.00
1		0110	15	.00	.00	.00	0.	*	1		1340	165	.00	.00
1		0115	16	.00	.00	.00	0.	*	1		1345	166	.00	.00
1		0120	17	.00	.00	.00	0.	*	1		1350	167	.00	.00
1		0125	18	.00	.00	.00	0.	*	1		1355	168	.00	.00
1		0130	19	.00	.00	.00	0.	*	1		1400	169	.00	.00
1		0135	20	.00	.00	.00	0.	*	1		1405	170	.00	.00
1		0140	21	.00	.00	.00	0.	*	1		1410	171	.00	.00
1		0145	22	.00	.00	.00	0.	*	1		1415	172	.00	.00
1		0150	23	.00	.00	.00	0.	*	1		1420	173	.00	.00
1		0155	24	.00	.00	.00	0.	*	1		1425	174	.00	.00
1		0200	25	.00	.00	.00	0.	*	1		1430	175	.00	.00
1		0205	26	.00	.00	.00	0.	*	1		1435	176	.00	.00
1		0210	27	.00	.00	.00	0.	*	1		1440	177	.00	.00
1		0215	28	.00	.00	.00	0.	*	1		1445	178	.00	.00
1		0220	29	.00	.00	.00	0.	*	1		1450	179	.00	.00
1		0225	30	.00	.00	.00	0.	*	1		1455	180	.00	.00

1	0230	31	.00	.00	.00	0.	*	1	1500	181	.00	.00
1	0235	32	.00	.00	.00	0.	*	1	1505	182	.00	.00
1	0240	33	.00	.00	.00	0.	*	1	1510	183	.00	.00
1	0245	34	.00	.00	.00	0.	*	1	1515	184	.00	.00
1	0250	35	.00	.00	.00	0.	*	1	1520	185	.00	.00
1	0255	36	.00	.00	.00	0.	*	1	1525	186	.00	.00
1	0300	37	.00	.00	.00	0.	*	1	1530	187	.00	.00
1	0305	38	.00	.00	.00	0.	*	1	1535	188	.00	.00
1	0310	39	.00	.00	.00	0.	*	1	1540	189	.00	.00
1	0315	40	.00	.00	.00	0.	*	1	1545	190	.00	.00
1	0320	41	.00	.00	.00	0.	*	1	1550	191	.00	.00
1	0325	42	.00	.00	.00	0.	*	1	1555	192	.00	.00
1	0330	43	.00	.00	.00	0.	*	1	1600	193	.00	.00
1	0335	44	.00	.00	.00	0.	*	1	1605	194	.00	.00
1	0340	45	.00	.00	.00	0.	*	1	1610	195	.00	.00
1	0345	46	.00	.00	.00	0.	*	1	1615	196	.00	.00
1	0350	47	.00	.00	.00	0.	*	1	1620	197	.00	.00
1	0355	48	.00	.00	.00	0.	*	1	1625	198	.00	.00
1	0400	49	.00	.00	.00	0.	*	1	1630	199	.00	.00
1	0405	50	.00	.00	.00	0.	*	1	1635	200	.00	.00
1	0410	51	.00	.00	.00	0.	*	1	1640	201	.00	.00
1	0415	52	.00	.00	.00	0.	*	1	1645	202	.00	.00
1	0420	53	.00	.00	.00	0.	*	1	1650	203	.00	.00
1	0425	54	.00	.00	.00	0.	*	1	1655	204	.00	.00
1	0430	55	.00	.00	.00	0.	*	1	1700	205	.00	.00
1	0435	56	.00	.00	.00	0.	*	1	1705	206	.00	.00
1	0440	57	.00	.00	.00	0.	*	1	1710	207	.00	.00
1	0445	58	.00	.00	.00	0.	*	1	1715	208	.00	.00
1	0450	59	.00	.00	.00	0.	*	1	1720	209	.00	.00
1	0455	60	.00	.00	.00	0.	*	1	1725	210	.00	.00
1	0500	61	.00	.00	.00	0.	*	1	1730	211	.00	.00
1	0505	62	.00	.00	.00	0.	*	1	1735	212	.00	.00
1	0510	63	.00	.00	.00	0.	*	1	1740	213	.00	.00
1	0515	64	.00	.00	.00	0.	*	1	1745	214	.00	.00
1	0520	65	.00	.00	.00	0.	*	1	1750	215	.00	.00
1	0525	66	.00	.00	.00	0.	*	1	1755	216	.00	.00
1	0530	67	.00	.00	.00	0.	*	1	1800	217	.00	.00
1	0535	68	.00	.00	.00	0.	*	1	1805	218	.00	.00
1	0540	69	.00	.00	.00	0.	*	1	1810	219	.00	.00
1	0545	70	.00	.00	.00	0.	*	1	1815	220	.00	.00
1	0550	71	.00	.00	.00	0.	*	1	1820	221	.00	.00
1	0555	72	.00	.00	.00	0.	*	1	1825	222	.00	.00
1	0600	73	.00	.00	.00	0.	*	1	1830	223	.00	.00
1	0605	74	.00	.00	.00	0.	*	1	1835	224	.00	.00
1	0610	75	.00	.00	.00	0.	*	1	1840	225	.00	.00
1	0615	76	.00	.00	.00	0.	*	1	1845	226	.00	.00
1	0620	77	.00	.00	.00	0.	*	1	1850	227	.00	.00
1	0625	78	.00	.00	.00	0.	*	1	1855	228	.00	.00
1	0630	79	.00	.00	.00	0.	*	1	1900	229	.00	.00

1	0635	80	.00	.00	.00	0.	*	1	1905	230	.00	.00
1	0640	81	.00	.00	.00	0.	*	1	1910	231	.00	.00
1	0645	82	.00	.00	.00	0.	*	1	1915	232	.00	.00
1	0650	83	.00	.00	.00	0.	*	1	1920	233	.00	.00
1	0655	84	.00	.00	.00	0.	*	1	1925	234	.00	.00
1	0700	85	.00	.00	.00	0.	*	1	1930	235	.00	.00
1	0705	86	.00	.00	.00	0.	*	1	1935	236	.00	.00
1	0710	87	.00	.00	.00	0.	*	1	1940	237	.00	.00
1	0715	88	.00	.00	.00	0.	*	1	1945	238	.00	.00
1	0720	89	.00	.00	.00	0.	*	1	1950	239	.00	.00
1	0725	90	.00	.00	.00	0.	*	1	1955	240	.00	.00
1	0730	91	.00	.00	.00	0.	*	1	2000	241	.00	.00
1	0735	92	.00	.00	.00	0.	*	1	2005	242	.00	.00
1	0740	93	.00	.00	.00	0.	*	1	2010	243	.00	.00
1	0745	94	.00	.00	.00	0.	*	1	2015	244	.00	.00
1	0750	95	.00	.00	.00	0.	*	1	2020	245	.00	.00
1	0755	96	.00	.00	.00	0.	*	1	2025	246	.00	.00
1	0800	97	.00	.00	.00	0.	*	1	2030	247	.00	.00
1	0805	98	.00	.00	.00	0.	*	1	2035	248	.00	.00
1	0810	99	.00	.00	.00	0.	*	1	2040	249	.00	.00
1	0815	100	.00	.00	.00	0.	*	1	2045	250	.00	.00
1	0820	101	.00	.00	.00	0.	*	1	2050	251	.00	.00
1	0825	102	.00	.00	.00	0.	*	1	2055	252	.00	.00
1	0830	103	.00	.00	.00	0.	*	1	2100	253	.00	.00
1	0835	104	.00	.00	.00	0.	*	1	2105	254	.00	.00
1	0840	105	.00	.00	.00	0.	*	1	2110	255	.00	.00
1	0845	106	.00	.00	.00	0.	*	1	2115	256	.00	.00
1	0850	107	.00	.00	.00	0.	*	1	2120	257	.00	.00
1	0855	108	.00	.00	.00	0.	*	1	2125	258	.00	.00
1	0900	109	.00	.00	.00	0.	*	1	2130	259	.00	.00
1	0905	110	.00	.00	.00	0.	*	1	2135	260	.00	.00
1	0910	111	.00	.00	.00	0.	*	1	2140	261	.00	.00
1	0915	112	.00	.00	.00	0.	*	1	2145	262	.00	.00
1	0920	113	.00	.00	.00	0.	*	1	2150	263	.00	.00
1	0925	114	.00	.00	.00	0.	*	1	2155	264	.00	.00
1	0930	115	.00	.00	.00	0.	*	1	2200	265	.00	.00
1	0935	116	.00	.00	.00	0.	*	1	2205	266	.00	.00
1	0940	117	.00	.00	.00	0.	*	1	2210	267	.00	.00
1	0945	118	.00	.00	.00	0.	*	1	2215	268	.00	.00
1	0950	119	.00	.00	.00	0.	*	1	2220	269	.00	.00
1	0955	120	.00	.00	.00	0.	*	1	2225	270	.00	.00
1	1000	121	.00	.00	.00	0.	*	1	2230	271	.00	.00
1	1005	122	.00	.00	.00	0.	*	1	2235	272	.00	.00
1	1010	123	.00	.00	.00	0.	*	1	2240	273	.00	.00
1	1015	124	.00	.00	.00	0.	*	1	2245	274	.00	.00
1	1020	125	.00	.00	.00	0.	*	1	2250	275	.00	.00
1	1025	126	.00	.00	.00	0.	*	1	2255	276	.00	.00
1	1030	127	.00	.00	.00	0.	*	1	2300	277	.00	.00
1	1035	128	.00	.00	.00	0.	*	1	2305	278	.00	.00

1	1040	129	.00	.00	.00	0.	*	1	2310	279	.00	.00
1	1045	130	.00	.00	.00	0.	*	1	2315	280	.00	.00
1	1050	131	.00	.00	.00	0.	*	1	2320	281	.00	.00
1	1055	132	.00	.00	.00	0.	*	1	2325	282	.00	.00
1	1100	133	.00	.00	.00	0.	*	1	2330	283	.00	.00
1	1105	134	.00	.00	.00	0.	*	1	2335	284	.00	.00
1	1110	135	.00	.00	.00	0.	*	1	2340	285	.00	.00
1	1115	136	.00	.00	.00	0.	*	1	2345	286	.00	.00
1	1120	137	.00	.00	.00	0.	*	1	2350	287	.00	.00
1	1125	138	.00	.00	.00	0.	*	1	2355	288	.00	.00
1	1130	139	.00	.00	.00	0.	*	2	0000	289	.00	.00
1	1135	140	.00	.00	.00	0.	*	2	0005	290	.00	.00
1	1140	141	.00	.00	.00	0.	*	2	0010	291	.00	.00
1	1145	142	.00	.00	.00	0.	*	2	0015	292	.00	.00
1	1150	143	.00	.00	.00	0.	*	2	0020	293	.00	.00
1	1155	144	.00	.00	.00	0.	*	2	0025	294	.00	.00
1	1200	145	.00	.00	.00	0.	*	2	0030	295	.00	.00
1	1205	146	.00	.00	.00	0.	*	2	0035	296	.00	.00
1	1210	147	.00	.00	.00	0.	*	2	0040	297	.00	.00
1	1215	148	.00	.00	.00	0.	*	2	0045	298	.00	.00
1	1220	149	.00	.00	.00	0.	*	2	0050	299	.00	.00
1	1225	150	.00	.00	.00	0.	*	2	0055	300	.00	.00
							*					

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TOTAL RAINFALL = .47, TOTAL LOSS = .00, TOTAL EXCESS = .47

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 0.	.00		0.	0.	0.	0.
		(INCHES)	.000	.000	.000	.000
		(AC-FT)	0.	0.	0.	0.

CUMULATIVE AREA = .32 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	M
+	HYDROGRAPH AT	DAM	0.	.00	0.	0.	0.	.32	